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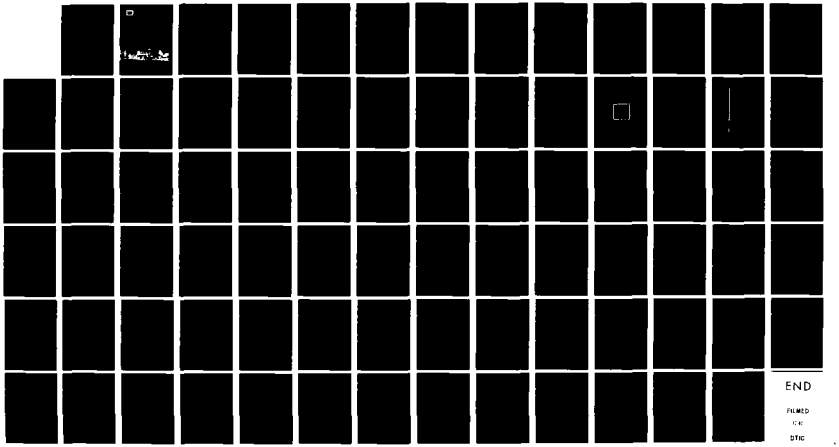

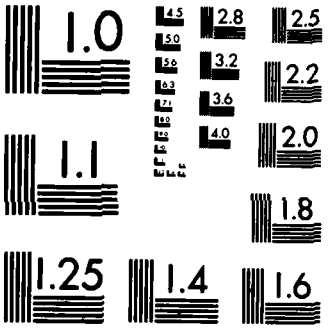

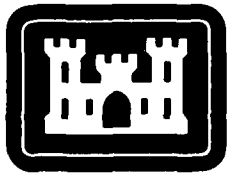

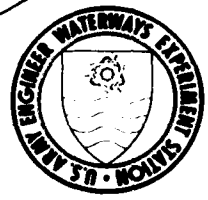

MISCELLANEOUS PAPER GL-82-14

PRELIMINARY INVESTIGATION OF A PROPOSED PEARL RIVER CUTOFF THROUGH THE OLD JACKSON SANITARY LANDFILL

by

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September 1982
Final Report

Prepared for U. S. Army Engineer District, Mobile
Mobile, Ala. 36628

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

Solutions are presently being sought to reduce flooding along the Pearl River in the Jackson, Miss. area. Geotechnical considerations for one particular alternative are reported herein. A cutoff channel through the old Jackson Sanitary Landfill would considerably reduce the stage of the Pearl River. Problems stemming from environmental restrictions might include lining the channel with a low permeability material to prevent leachate infiltration from the landfill into the river. Soil borings were made and samples obtained at various depths along the center line to characterize the existing (Continued)

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20. ABSTRACT (Continued).

soil conditions. Stability analyses were performed for the desired side slopes. Quantities of cut and required backfill were computed based on cross section and profile data obtained along the proposed center line.

Results from this report will be used by the U. S. Army Engineer District, Mobile in preparing a cost estimate to be used in a feasibility study for the proposed Pearl River cutoff channel.

Preface

The feasibility study described in this report was requested by Intra-Army Order for Reimbursable Services (DA 2544) No. FC-82-0017 from the U. S. Army Engineer District, Mobile, Alabama, dated 17 November 1981, to the Commander and Director, U. S. Army Engineer Waterways Experiment Station (WES), CE, Vicksburg, Mississippi.

The testing and analysis were conducted by personnel of the Geotechnical Laboratory (GL), WES, under the general supervision of Dr. W. F. Marcuson III, Chief of GL, Dr. P. F. Hadala, Assistant Chief of GL, and Mr. H. H. Ulery, Acting Chief of Pavement Systems Division (PSD); and under the direct supervision of Messrs. J. W. Hall, Jr., and A. J. Bush III, PSD. Slope stability analyses were performed with the aid of Mr. Yu Shih Jeng, Soil Mechanics Division. The geological portion of the study was written by Mr. Charlie Whitten, Engineering Geology and Rock Mechanics Division. The report was prepared by Mr. D. R. Alexander, PSD.

The Commander and Director of WES during the conduct of the investigation and preparation of this report was COL Tilford C. Creel, CE. The Technical Director was Mr. Fred R. Brown.

Contents

Conversion Factors, U. S. Customary to Metric (SI) Units of Measurement

U. S. customary units of measurement used in this report can be converted to metric (SI) units as follows:

Multiply	By	To Obtain
acres	4046.856	square metres
cubic feet	0.2831685	cubic metres
cubic yards	0.7645549	cubic metres
feet	0.3048	metres
feet per second	0.3048	metres per second
inches	25.4	millimetres
miles (U. S. statute)	1.609344	kilometres
pounds (mass)	0.4535924	kilograms
pounds (mass) per cubic foot	16.01846	kilograms per cubic metre
square feet	0.9290304	square metres

PRELIMINARY INVESTIGATION OF A PROPOSED PEARL RIVER CUTOFF THROUGH THE OLD JACKSON SANITARY LANDFILL

Background

1. The U. S. Army Engineer District, Mobile, Alabama, is currently evaluating several alternatives to reduce flooding near Jackson, Mississippi. One alternative involves excavating a channel through the old Jackson Sanitary Landfill. The proposed Pearl River cutoff is in southwest Jackson in the SW 1/4, S22, T5N, R1E (Figure 1). Figure 2 shows a location sketch of the landfill, which was closed in the mid-1970's. The site referred to in the text includes the landfill of approximately 127 acres.* The industrial waste generated in the Jackson area includes, but is not limited to, waste from printing; plastic manufacturing; household cleaning compound manufacturing; cottonseed oil production; insulation manufacturing; wood, metal, and cardboard containers manufacturing; paint manufacturing and operations; meat and other food processing; metal fabrication; furniture manufacturing; tool and die operations, bottling and canning industry; concrete and asphalt industry; wood preserving; machinery manufacturing; electrical generators; light bulbs and fixtures manufacturing; used oil refining; and others that are identifiable through the Mississippi Manufacturers Association's directory and city tax and permit records. Problems associated with excavating a channel through a potentially hazardous landfill area are assessed. The geotechnical information provided in this report will be used by the Mobile District in conjunction with a study performed by the Environmental Laboratory of the U. S. Army Engineer Waterways Experiment Station (WES) to evaluate the overall feasibility of the proposed cutoff. The final evaluation will be addressed in a survey report for the Pearl River Basin.

Purpose

2. The purpose of this study is to characterize the existing soil conditions

* A table of factors for converting U. S. customary units of measurement to metric (SI) units is presented on page 3.

along the proposed channel route, analyze data, and provide design recommendations. Special consideration has been given to the particular problems associated with excavation through a sanitary landfill. The channel design must be such that little or no seepage of potentially harmful leachate from the landfill into the river will occur. There apparently has been no consideration of the occurrence of general area flooding with consequent bank overtopping and landfill leachate entering the entire floodplain. This channel design is based on geotechnical considerations only. An estimate of the required volume of earthwork was made based on a preliminary channel design.

Field Investigations

Preliminary

3. Before the field investigation, boring data in close proximity to the site were obtained from the Mississippi Highway Department (MHD) and the Mississippi Geological Survey (MGS). The MHD foundation and channel change borings are 0.75 miles north of the site along the Interstate 20 and 55 bridges over the Pearl River floodplain (see Appendix A).

4. A chronological sequence of stereo aerial photographs (1940, 1949, 1955, 1959, 1965, 1972, and 1979) was obtained from the National Archieves and the U. S. Department of Agriculture. Topographic maps published in 1963 and 1980 were obtained from the U. S. Geological Survey (USGS).

Site description

5. The site is located in the Pearl River floodplain and is bounded by the Pearl River to the northeast, east, and south. The prelandfill surface contained point bar deposits ranging from el 245.0 to 265.0.* Small stream channels from the uplands cut into the northwest and southwest corners of the site before emptying into the Pearl River.

6. The topography was totally changed by the addition of the landfill material. Aerial photographs show that approximately 20 percent of the site area along the western edge was being actively used as a landfill site in 1965. Data

* All elevations (el) cited herein are in feet referred to mean sea level.

from the 1963 USGS topographic maps show that approximately 1×10^5 cu yd of landfill material had been added to the site. Increased use of the site from 1965 until its closure in the mid-1970's changed the topography from a relatively flat floodplain to gently rolling hills ranging from el 250.0 to 295.0. A comparison of 1963 and 1980 USGS topography maps shows that approximately 2.1×10^6 cu yd of landfill material were placed on the site during that time period. A total of approximately 2.2×10^6 cu yd of landfill material has been added to the site.

7. The proposed channel route is crossed by power transmission lines approximately 600 ft from the north end and by an 18-in. gas line buried 54 in. approximately 600 ft from the south end.

Survey data

8. Rod and level data were obtained at 100-ft intervals along the center line of the proposed channel. The profile is plotted in Figure 3. Station 0+00 is located at the north end of the channel route.

Drilling and sampling

9. A two-phase drilling program was conducted to (a) install groundwater sampling wells and (b) obtain samples of the strata to a depth of 10 ft below the proposed channel invert of el 227.0. Two wells, W-1 and W-2, were drilled upstream (north of site) for background water quality, and four wells, W-3 through W-6, were drilled along the center line of the proposed channel cut (see Appendix B for boring logs). No soil samples were collected from the well borings. Seven splitspoon sampling holes (DH-1 through DH-7) were drilled along the proposed channel cut (see Appendix C). Representative samples were obtained from standard penetration splitspoon tests (SPT) at 5-ft intervals from the top of natural ground (prelandfill surface) to a minimum elevation of 217.0. Figure 4 presents the locations, offsets, and a summary of the boring data, and Figures 5-11 show the soil profiles from each boring.

10. Concrete blocks, steel beams, chain link fences, and other such items were encountered throughout the landfill material. Boring DH-6 had to be relocated seven times before the boring could be completed.

Stratigraphy

11. The local stratigraphy consists of Holocene or Recent Alluvium overlying Tertiary units. The MHD borings north of the site show 15 to 30 ft of

alluvial clay, silt, sand, and pea gravel overlying the Eocene Moodys Branch and Cockfield formations (Table 1). The Upper Eocene Yazoo clay is the Tertiary unit underlying the landfill site.* The MGS electric log file of boring N-10, the Filtrol Corporation Deep Monitor Well No. 1 located 0.75 miles west of the site, shows that the Yazoo clay is approximately 100 ft thick with its base at el 137.0.

12. The stratigraphic column along the channel cut consists of up to 30 ft of landfill material, overlying 20 to 25 ft of Recent Alluvium, which overlies the Upper Eocene Yazoo clay. The Recent Alluvium consists of a fining upward sequence of clay, silt, sand, and pea gravel. A typical vertical section of alluvium would have up to 10 ft of clay or silt overlying up to 25 ft of fine-to-medium sand with less than 1 ft of sandy pea gravel at the base. Fine-to-medium sand is the predominant material in the alluvium.

13. The Yazoo clay is a light green (light gray when dry), fossiliferous, stiff, plastic, montmorillonitic (highly expansive) clay. The top of the unit varies from el 233.0 to 238.0, except at boring DH-6 where the elevation dips to 224.0 in a shallow channel-like feature. The deepest penetration in the Yazoo clay was approximately 25 ft in borings DH-1, DH-2, and DH-3.

Groundwater

14. The water table at the site is primarily controlled by the rise and fall of the Pearl River. On 6 January 1982, the water table varied from el 250.0 to 255.0. Heavy rains the last week of January 1982 brought the Pearl River to bank-full stage. Corresponding rises in the water table were noted in the wells. Well W-3, located on the riverbank, was approximately 5 ft under water at that time. No perched water tables were encountered in the highly permeable landfill material.

Laboratory Tests

15. Jar samples obtained from the seven splitspoon sample holes were submitted to the laboratory for classification tests. Sieve analyses were performed

* W. H. Moore, 1965, "Hinds County Geology and Mineral Resources," Bulletin 105, Mississippi Geological Economic and Topographical Survey, Jackson, Mississippi.

on the sand materials. Aggregate grading curves for these samples are presented in Figures 12-27. Atterberg limit values for clay materials are shown on the boring profiles (Figures 5-11).

Stability

Cross section

16. The cross section chosen for stability analysis (Figure 28) was obtained from data at sta 14+18 (DH-7). The profile consists of 6-1/2 ft of highly plastic, fat clay (CH) overlain by 20 ft of sand and silty soil overlain by 33-1/2 ft of garbage. Although not a typical or mean cross section, it was chosen as being critical due to the height of the slopes. The cross section shows some of the garbage behind the slope removed and backfilled with the low plastic clay (CL), silty sand (SM), and gravelly sand (SP) materials excavated from below since adequate compaction cannot be obtained on the landfill material. Soil parameters were estimated based on laboratory results and Standard Penetration Test (SPT) values.

17. Side slopes of 1V on 3H were chosen as the minimum grade on which construction and compaction equipment can operate safely and efficiently. Such equipment will be necessary in constructing the low permeability boundaries that are required.

Analysis

18. The design cross section was anlayzed for stability using the wedge and arc methods. The wedge method was used to evaluate the upper failure plane along the lower surface of the garbage. The arc method was employed to check the stability throughout the entire cross section. Both analyses were performed for the case of sudden or rapid drawdown of the water level from el 170.0 to 137.0. It is anticipated that this case will be the most severe since rapid fluctuations in river stage are common along the Pearl. Figures 29 through 34 present results of the stability analyses. A minimum factor of safety of 1.20 was computed for an arc tangent to the upper surface of the CH material. The failure plane extends through the SP and SM-CL layers at a maximum depth of 5 ft.

Impervious Boundary

19. Environmental restraints possibly will dictate that measures be taken to prevent seepage of potentially hazardous leachate from the landfill into the river. If such restraints are required, a practical solution would be to blanket the sides of the channel with the CH material that will be excavated.

20. Eliminating the seepage problem with a low permeability blanket would create another problem. In the case of rapid drawdown, the hydrostatic pressures behind this blanket would be extremely high bringing about the possibility of blowouts in the clay liner. Some type of relief system, such as backdrains, seepage trenches, or relief wells, would be required to guard against failures of this nature. If environmental restrictions require that the bleedoff from such a relief system be treated, the more costly alternative of wells and pumps would be recommended to transport the contaminated material to holding ponds. Backdrains or trenches might be considered if the bleedoff could be allowed to seep back into the landfill or be discharged into the river.

21. With the significant design and construction effort to create a boundary between landfill and river, some type of protection against erosion of the clay liner should be considered. Alternatives would include chemical stabilization with lime or cement, fabric or membrane liners, and riprap. Riprap placed along the slopes beginning at the CH layer and extending upward along the slopes should prove to be the most reliable solution under these circumstances. Based on the results of tests performed locally on the banks of the Big Black River, a thickness of 12 to 18 in. is recommended. Locally available riprap will have a weight of approximately 165 lb/cu ft. Gradation limits are summarized in the following tabulation:*

12-in. Thickness		18-in. Thickness	
Percent Lighter by Weight	Limits of Stone Weight, lb	Percent Lighter by Weight	Limits of Stone Weight, lb
100	35 - 86	100	117 - 292
50	17 - 26	50	58 - 86
15	5 - 13	15	18 - 43

* Office, Chief of Engineers, U. S. Army. 1971 (May). "Engineering and Design, Additional Guidance for Riprap Channel Protection," Engineer Technical Letter No. 1110-2-120, Washington, D. C.

Methane Gas

22. The presence of methane (natural gas) during excavation poses a potential safety hazard. If gas quantities are sufficiently large or concentrated, any open flame or spark could cause the gas to ignite. There have been incidents reported stating that diesel engines are difficult to stop if the air intake is rich in methane; however, most problems due to methane occur in situations where ventilation is poor. Measurements by the WES Environmental Laboratory show that the methane level at the site is considerable but probably will not be a permanent factor since the excavation will allow the gas to vent rapidly. The drilling crew reported no trouble with methane during the field exploration. However, the methane level should be monitored throughout the project to ensure the safety of construction workers.

Earthwork

23. Estimated quantities of earthwork for the proposed cutoff were calculated based on the channel design configuration (Figure 28). Six cross sections were chosen along the channel route at locations where boring data were available. Figures 35 through 40 show these sections and the areas used for the volume computations. Table 2 presents the computed volumes of cut in such a manner that the quantities of garbage, CH, CL, SM, and SP are readily distinguishable.

24. The amount of clay (CH) required for placement of a 5-ft-thick capping to a distance of 40 ft behind the slopes and for construction of a 3-ft-thick, low-permeability blanket over the slopes was calculated, as shown in Table 3. A shrinkage factor of 1.25 is assumed for the borrow material. Based on these calculations, a quantity of 2000 cu yd of CH soil would be required from some other source.

25. The amount of backfill required to replace the garbage immediately behind the slopes was computed, and the results are listed in Table 4. A shrinkage factor of 1.25 is assumed for the borrow material. These calculations show that a sufficient quantity of CL, SM, and SP materials will be excavated to meet the backfill demand.

26. The required volume of riprap to provide an 18-in.-thick protective layer beginning at the heavy clay and extending upward along the length of the side slopes was calculated, as shown in Table 5.

Summary

27. The proposed channel bottom, el 227.0, will be in Yazoo clay, except at boring DH-6 where it will be in alluvial sand. The Yazoo clay is 2 to 3 ft below the proposed channel bottom at boring DH-6. A typical vertical section along the proposed channel cut will have 5 to 10 ft of Yazoo clay overlain by 20 to 25 ft of alluvium, which is predominantly fine-to-medium sand, overlain by up to 30 ft of landfill material. Yazoo clay excavated from the channel cut is the only suitable material at the site that can be used for the upper bank blanket.

Recommended Procedures

28. The design procedures recommended as a result of the investigation are as follows:

a. Side slopes of 1V on 3H are recommended to accommodate construction and compaction equipment. Preliminary stability analyses yielded a minimum factor of safety of 1.20.

b. An estimated 573,000 cu yd of landfill material must be removed to another location or placed back on the landfill and covered. The quantity of cover material will be dependent on the desired cover ratio.

c. If environmental restraints require the minimization of leachate infiltration into the river, the placement of a 3-ft-thick (minimum) CH liner along the side slopes is recommended.

d. If the cutoff design includes a low-permeability liner along the sides, a relief system should be designed to relieve the hydrostatic pressures during periods of rapid drawdown. The type of system will be dependent on environmental considerations.

e. Riprap along the side slopes is recommended to prevent erosion of

the clay blanket. An 18-in.-thickness of riprap on the slopes would require 20,000 cu yd of stone.

f. Methane gas levels should be monitored throughout the excavation. It is anticipated that the gas will vent quickly and cause no major permanent problems.

g. The earthwork quantities shown in Tables 2 through 4 should be used in the cost estimate. A total volume of 830,000 cu yd is to be excavated. Of this total, 80,000 cu yd are CH, 177,000 cu yd are CL, SM, and SP soils, and 573,000 cu yd are landfill. The excavated CH material will be used to construct the clay blanket (50,000 cu yd) and cap behind the slopes (32,000 cu yd). An additional 2,000 cu yd of CH material must be acquired from another source should the liner be included in the design. The excavated CL, SM, and SP soils will be used to backfill behind the slopes (150,000 cu yd). An excess of 27,000 cu yd will be available as possible cover material for garbage.

Table 1

Stratigraphic Column*

Era	System	Series		Group	Formation	Description
Cenozoic	Quaternary	Holocene			Alluvium	Fine-to-coarse-grained sand, gravel, silt, and clay. Contains organic material in some localities.
Cenozoic	Tertiary	Eocene	Upper	Jackson	Yazoo Clay	Blue-green, calcareous, fossiliferous clay.
					Moody's Branch	Very limy, fossiliferous, glauconitic, clayey sand.
			Middle	Claiborne	Cockfield	Gray, silty, carbonaceous, micaceous clay. Gray, very fine- to fine-grained silty sands. Thin beds of lignite.

* Modified from: Moore, W. H. 1965."Hinds County Geology and Mineral Resources," Bulletin 105, Mississippi Geological Economic and Topographical Survey.

Table 2

Estimated Volume of Earthwork for Proposed Channel Cut

Station ft	End Area, sq ft			Total End Area sq ft	Distance ft	Volume of Cut, cu yd			Total Volume of cut cu yd	Accumulated Total Volume cu yd
	CH	CL,SM, and SP	Garbage			CH	CL,SM, and SP	Garbage		
0+00	1,152	3,859	9,219	14,230						
					424	19,300	43,052	154,666	217,017	
4+24	1,306	1,624	10,479	13,409						217,017
					334	18,259	26,132	108,346	152,737	
7+58	1,646	2,601	7,038	11,285						369,754
					277	19,252	21,750	54,820	95,822	
10+35	2,107	1,639	3,649	7,395						465,576
					447	19,312	49,840	159,935	229,087	
14+82	226	4,382	15,672	20,280						694,663
					248	4,345	36,552	94,538	135,435	
17+30	720	3,577	4,913	9.210						
						80,468	177,362	572,305		

Table 3

Required Volume of CH Material

Station ft	Required Length ft	Distance ft	Average Required Length, ft	Surface Area sq ft	Volume cu ft	Volume cu yd	Accumulated Total Volume cu yd
0+00	244						
		424	228.5	96,884	290,652	10,765	
4+24	213						19,765
		334	119	66,466	199,398	7,386	
7+58	185						18,151
		277	147.5	40,858	122,573	4,540	
10+35	110						22,691
		447	226.5	101,246	303,737	11,250	
14+82	343						33,941
		248	235.5	58,404	175,212	6,489	
17+30	128						40,430 (for 3-ft clay liner)

Required volume of CH = 40,430 cu yd (*1.25) = 50,538 cu yd
for impermeable liner

Required volume of CH = 25,630 cu yd (*1.25) = 32,037 cu yd
for 5-ft capping
behind slopes

Total CH required = 82,575 cu yd

CH excavated = 80,468 cu yd

CH to be acquired
from other source = 2,107 cu yd

* Shrinkage factor.

Table 4

Required Volume of CL, SM, and SP Soils for Backfill

Station ft	Area sq ft	Average Area sq ft	Distance ft	Volume cu yd	Accumulated Total Volume cu yd
0+00	1,763				
		2,127	424	33,402	
4+24	2,490				33,402
		1,887	334	23,343	
7+58	1,283				56,745
		913	277	9,367	
10+35	543				66,112
		2,148	447	35,562	
14+82	3,752				101,674
		1,951	248	17,921	
17+30	149				119,595

Required CL, SM, and SP for backfill = 119,595 (*1.25) = 149,494 cu yd

Excavated CL, SM, and SP = 177,326 cu yd

Excess CL, SM, and SP = 27,832 cu yd

* Shrinkage factor.

Table 5

Volume of Riprap Required for 18-in. Layer

Station ft	Required Length ft	Distance ft	Average Required Length ft	Surface Area sq ft	Volume cu ft	Volume cu yd	Accumulated Total Volume cu yd
0+00	244						
		424	228.5	96,884	145,326	5,383	
4+24	213						5,383
		334	199	66,466	99,699	3,693	
7+58	185						9,076
		277	147.5	40,858	61,287	2,270	
10+35	110						11,346
		447	226.5	101,246	151,869	5,625	
14+82	343						16,971
		248	235.5	58,404	87,606	3,245	
17+30	128						20,216

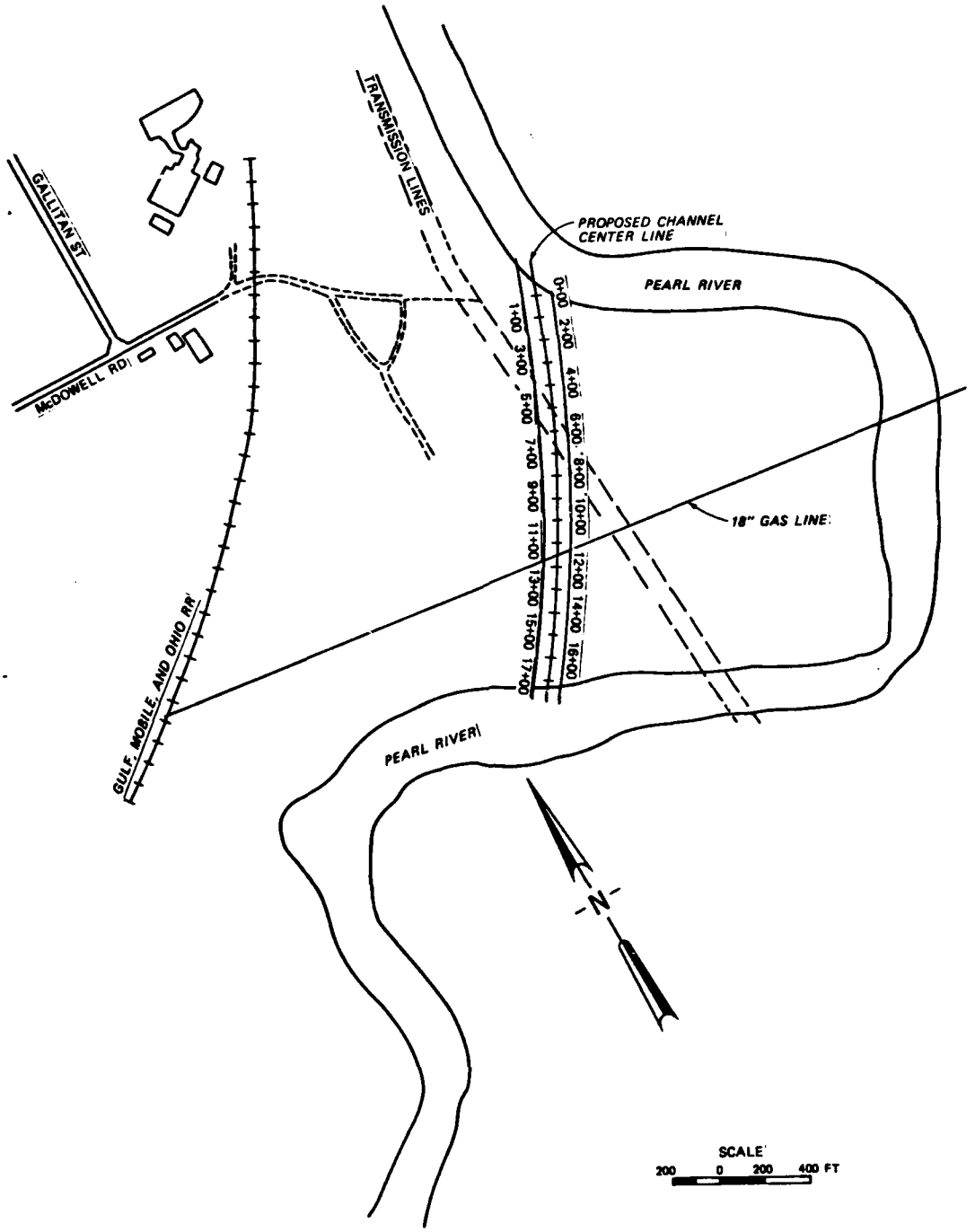


Figure 1. Location sketch with proposed cutoff marked in 100-ft increments

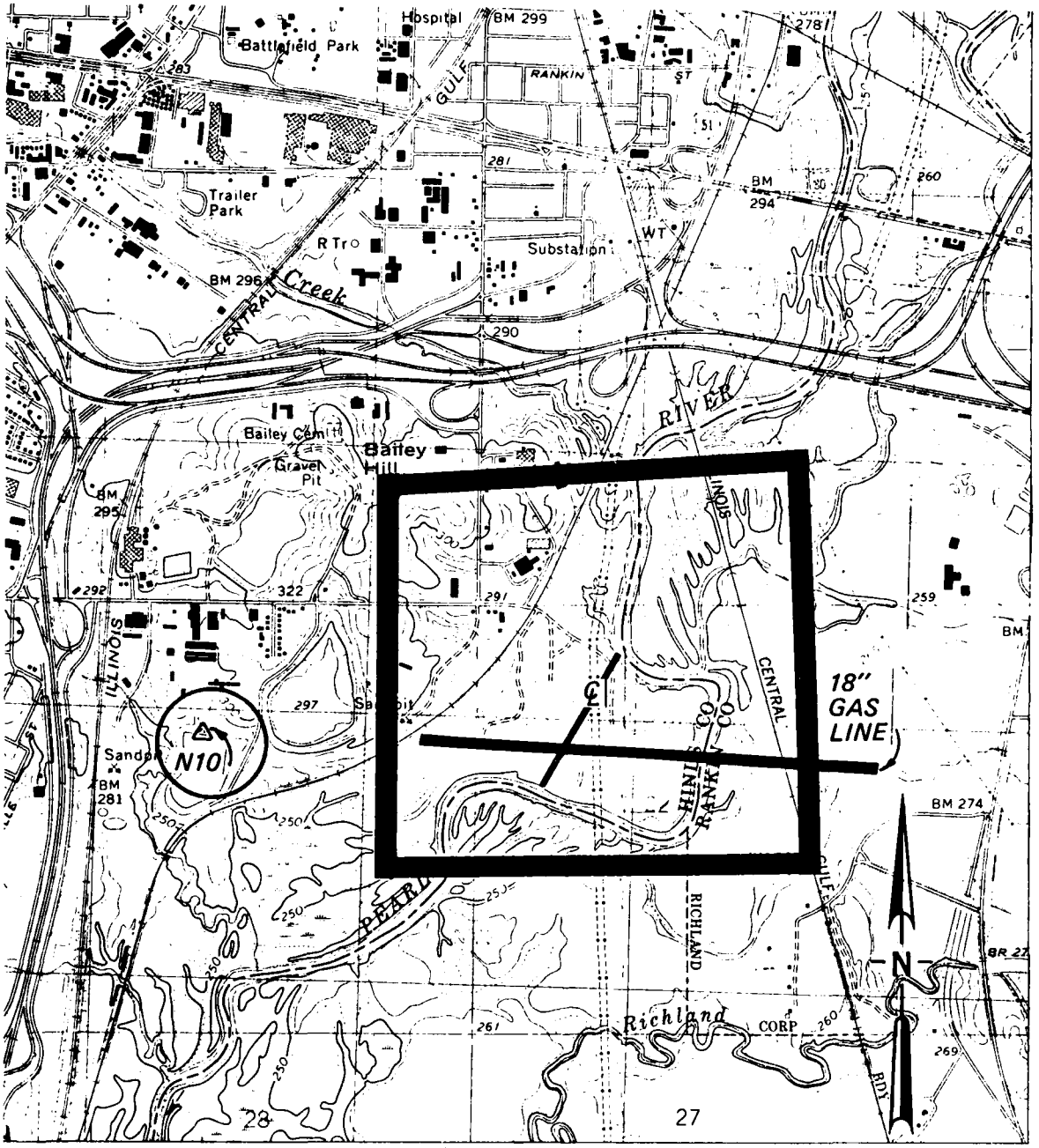


Figure 2. Location map with the center line of the proposed channel (Mississippi Geological Survey file boring N10 located west of the site)

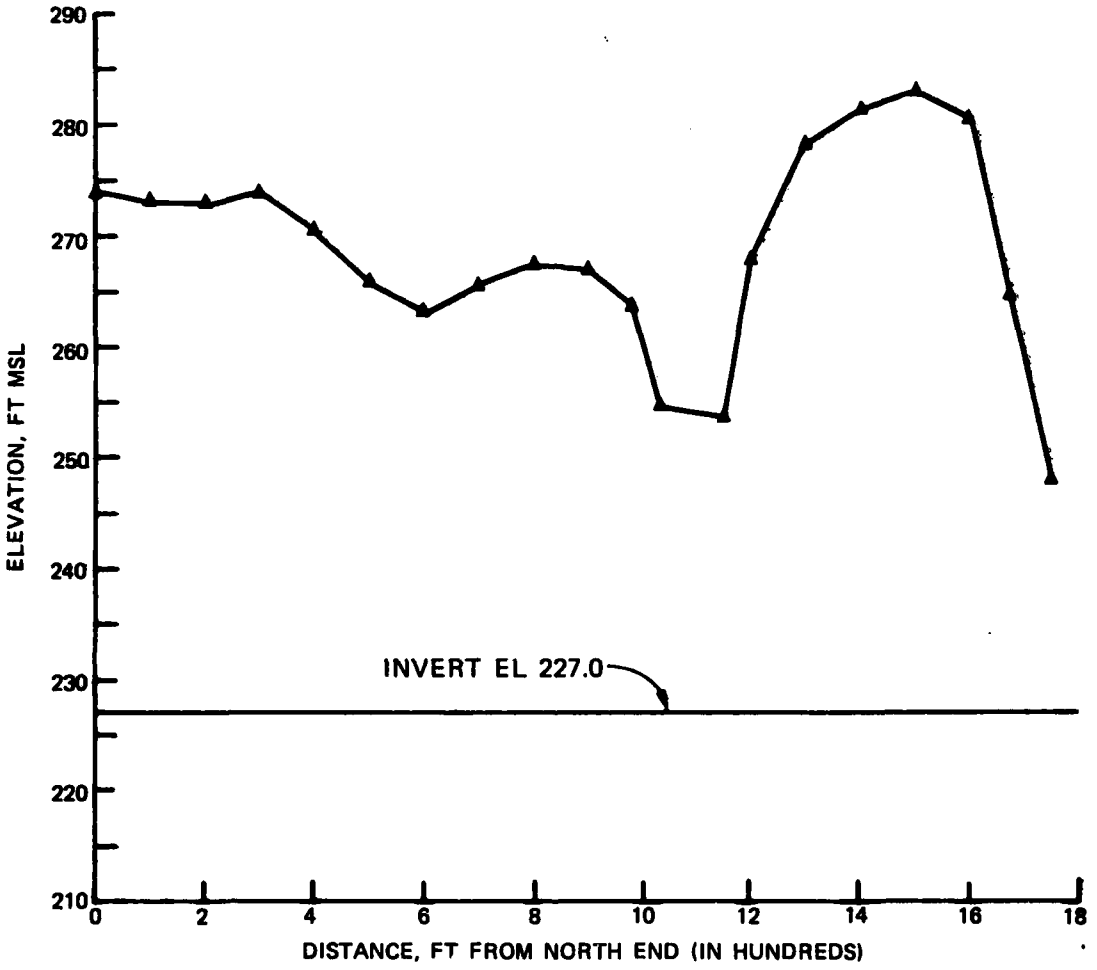


Figure 3. Center-line profile along proposed channel route

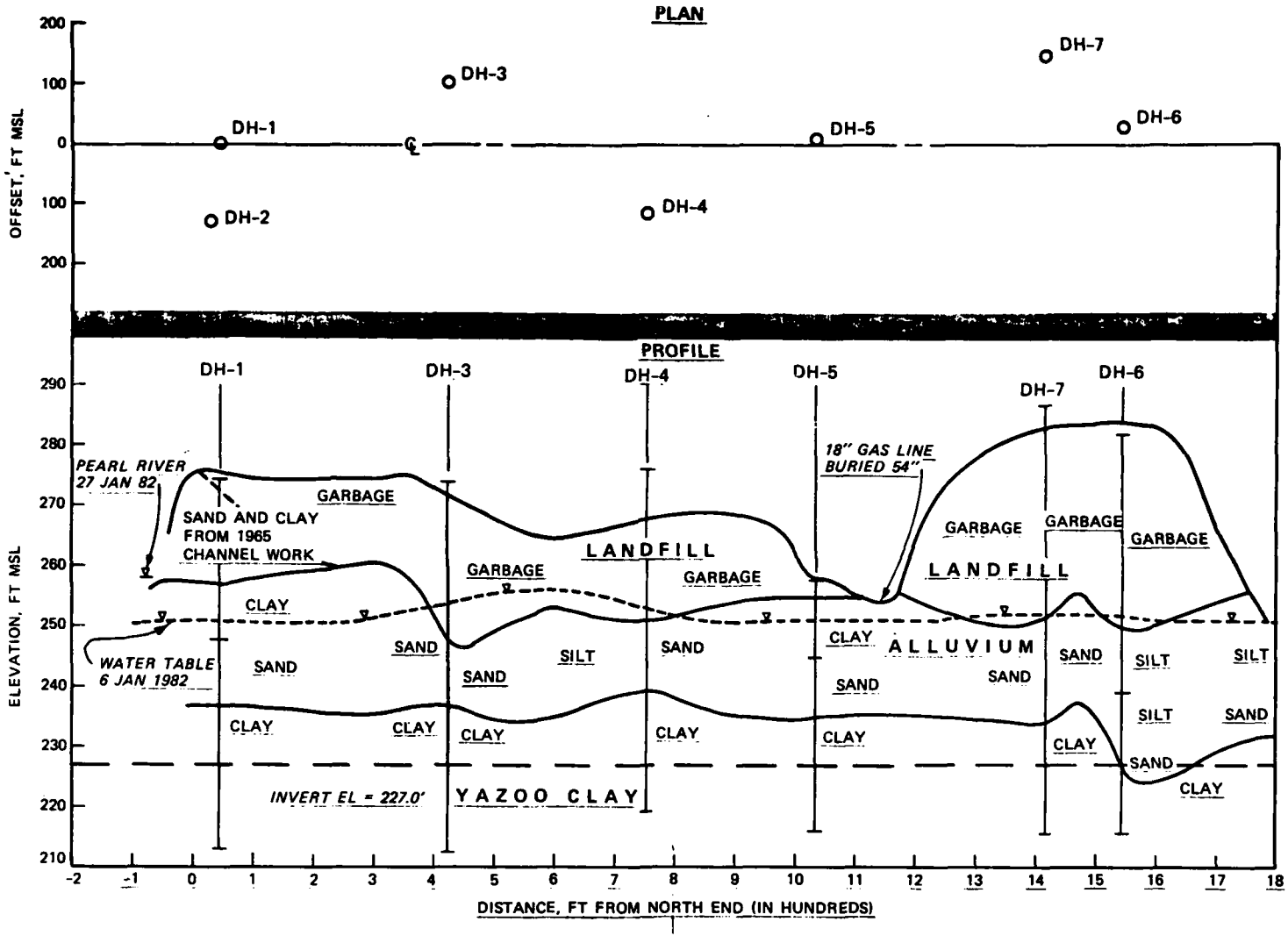


Figure 4. Plan view showing splitspoon sampling sites and the profile resulting from the subsurface investigation

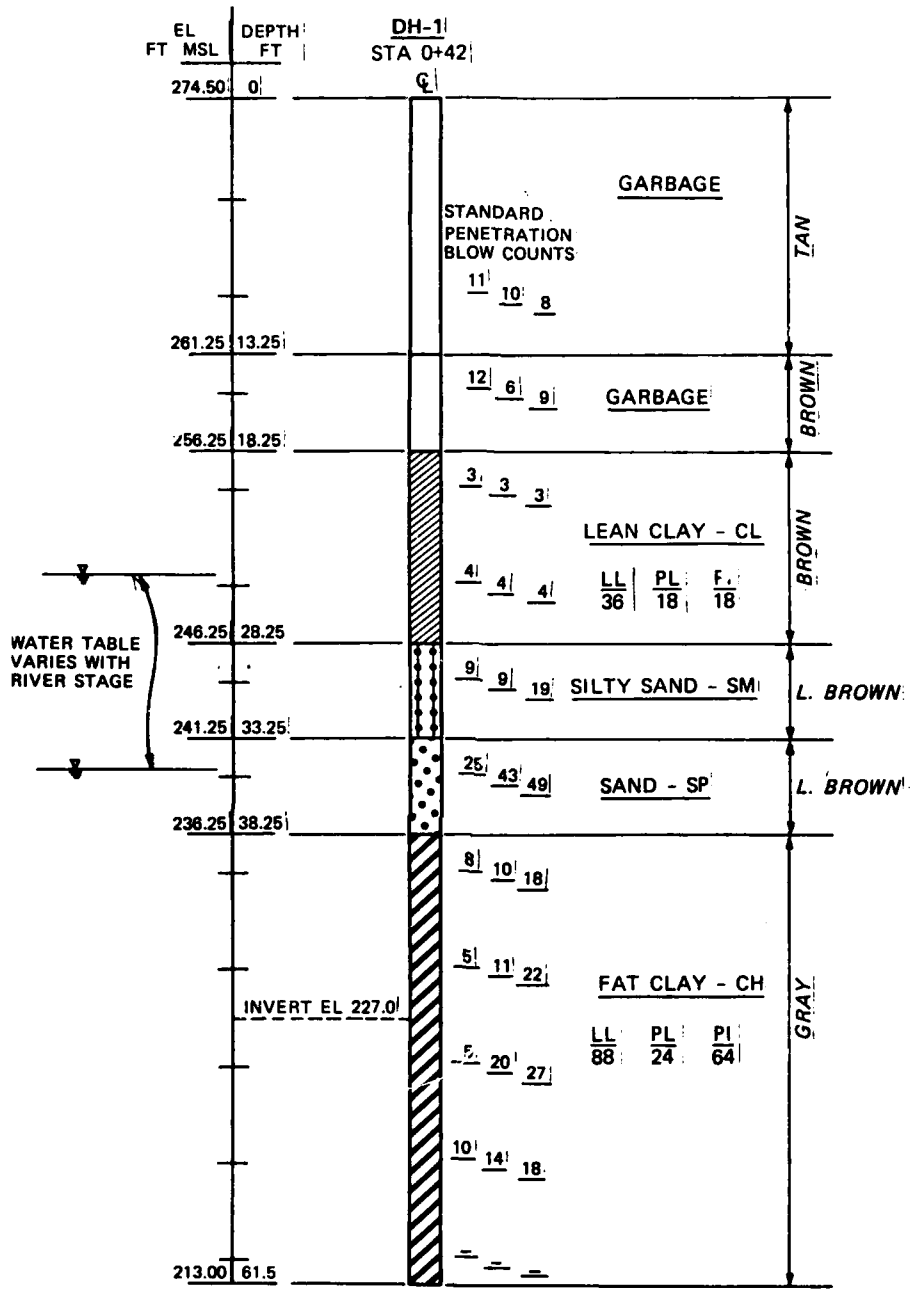


Figure 5. Boring profile from sample site DH-1

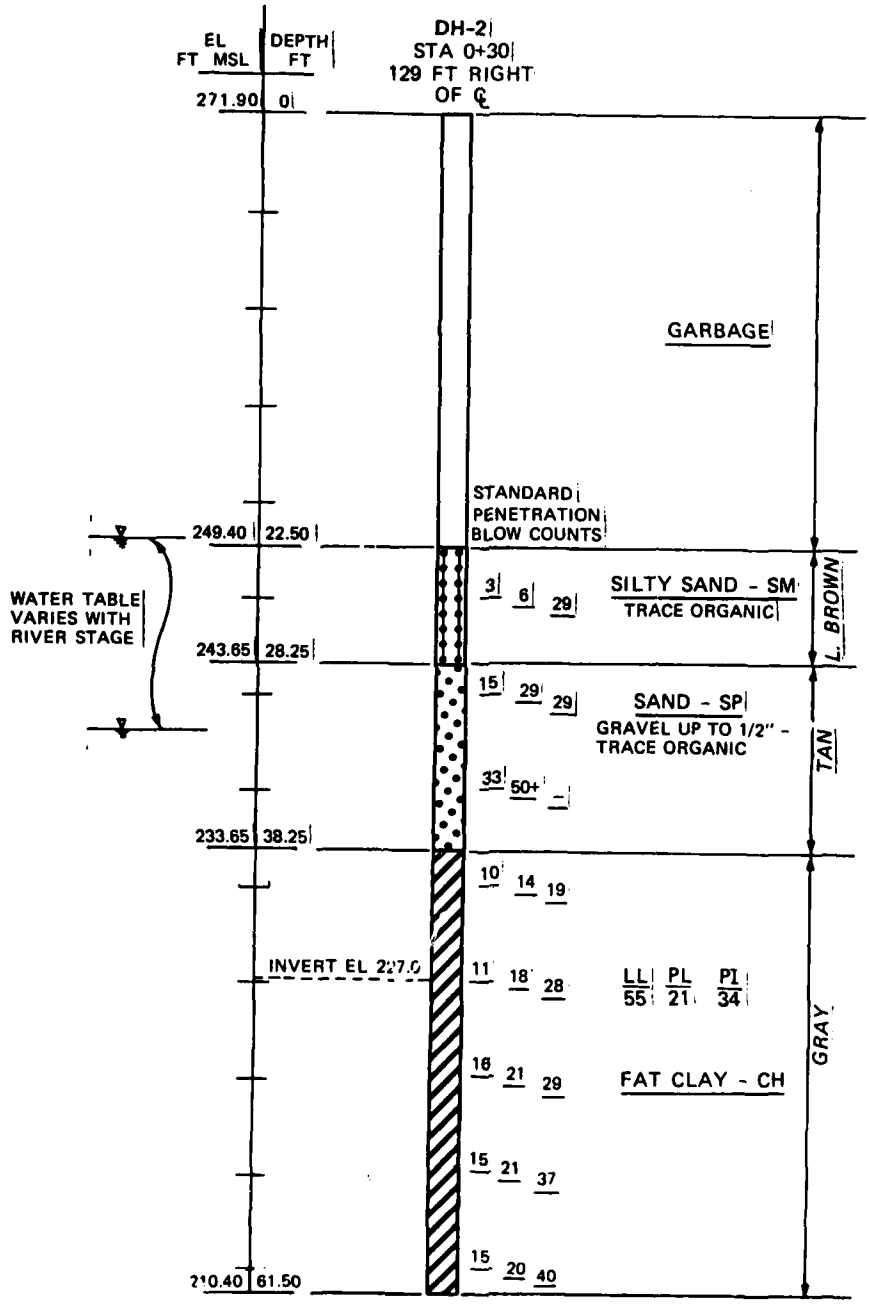


Figure 6. Boring profile from sample site DH-2

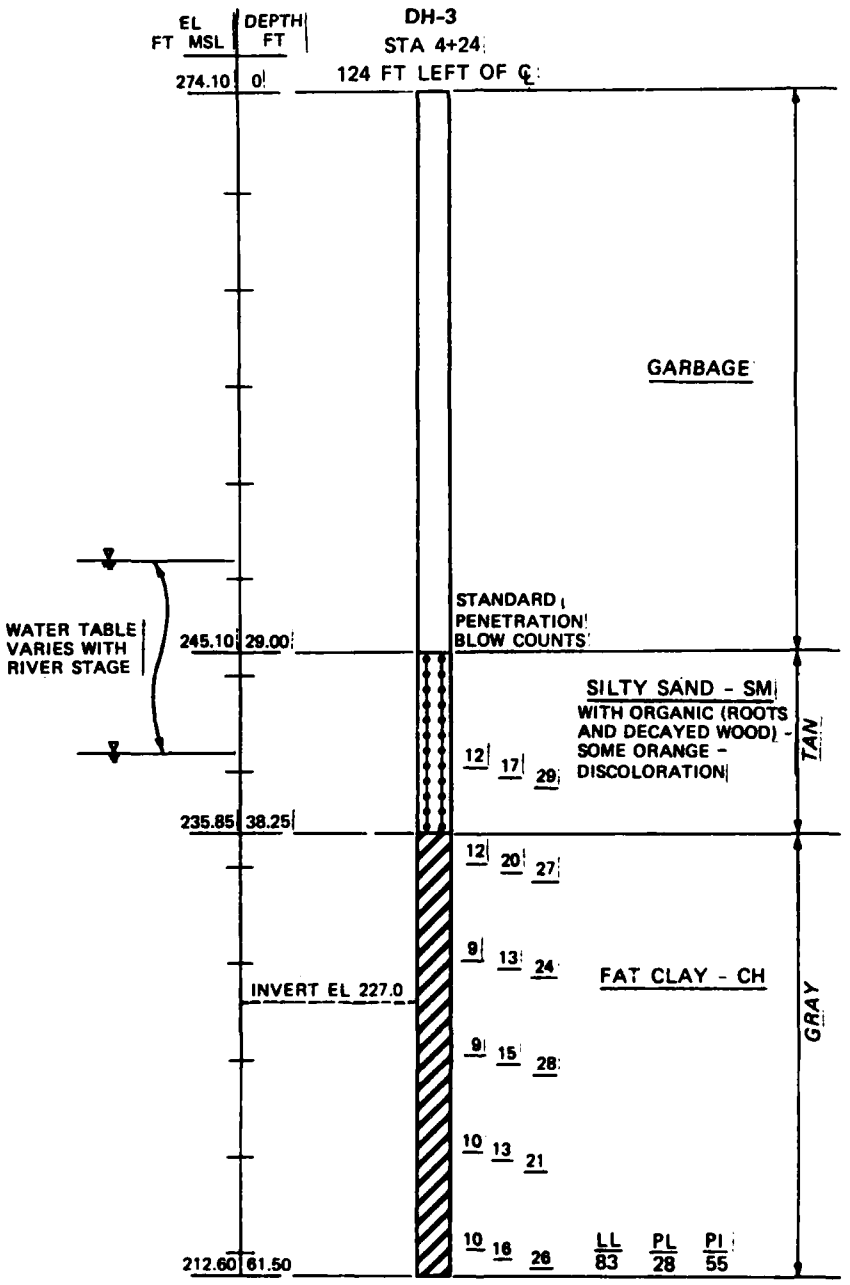


Figure 7. Boring profile from sample site DH-3

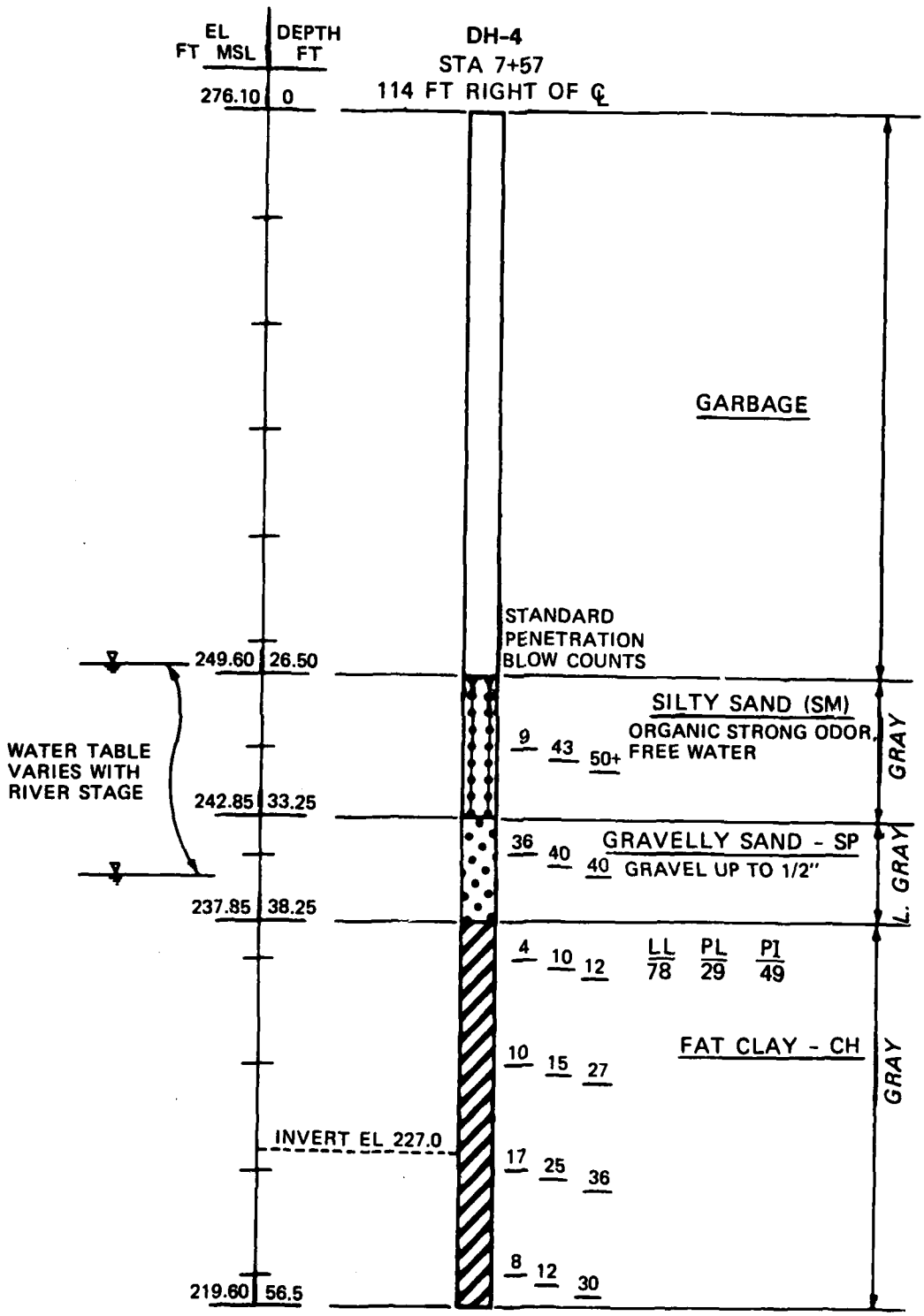


Figure 8. Boring profile from sample site DH-4

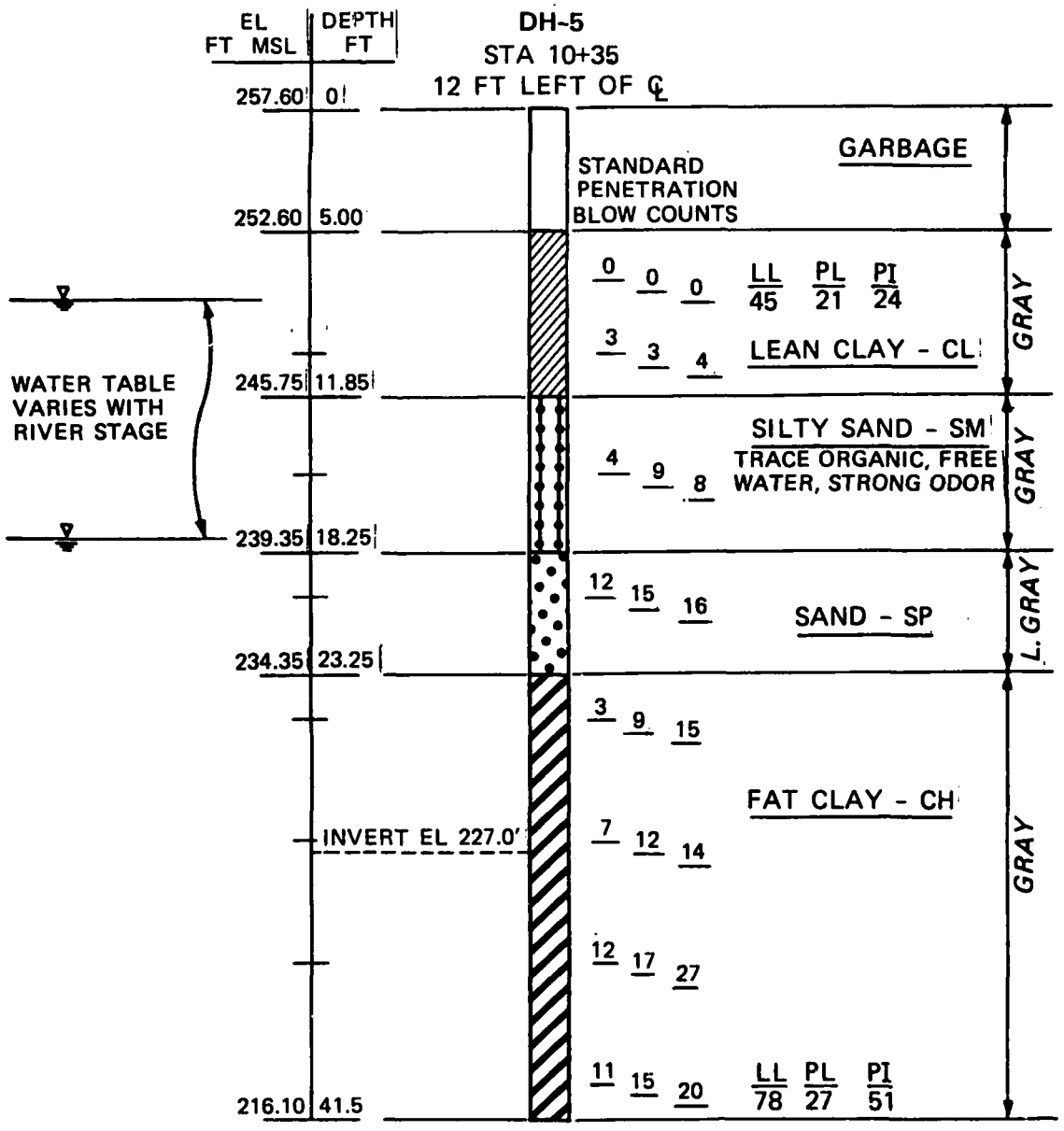


Figure 9. Boring profile from sample site DH-5

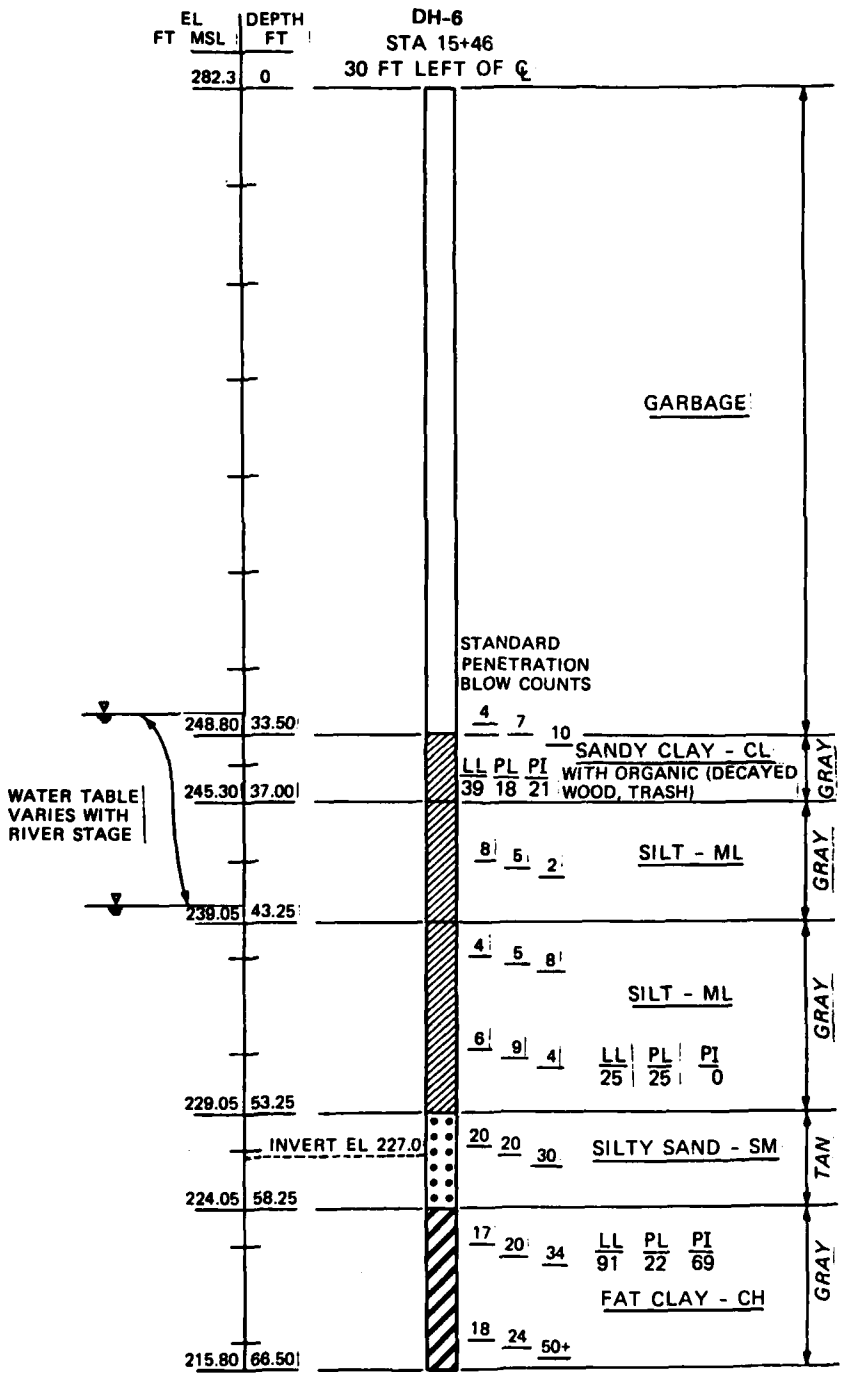


Figure 10. Boring profile from sample site DH-6

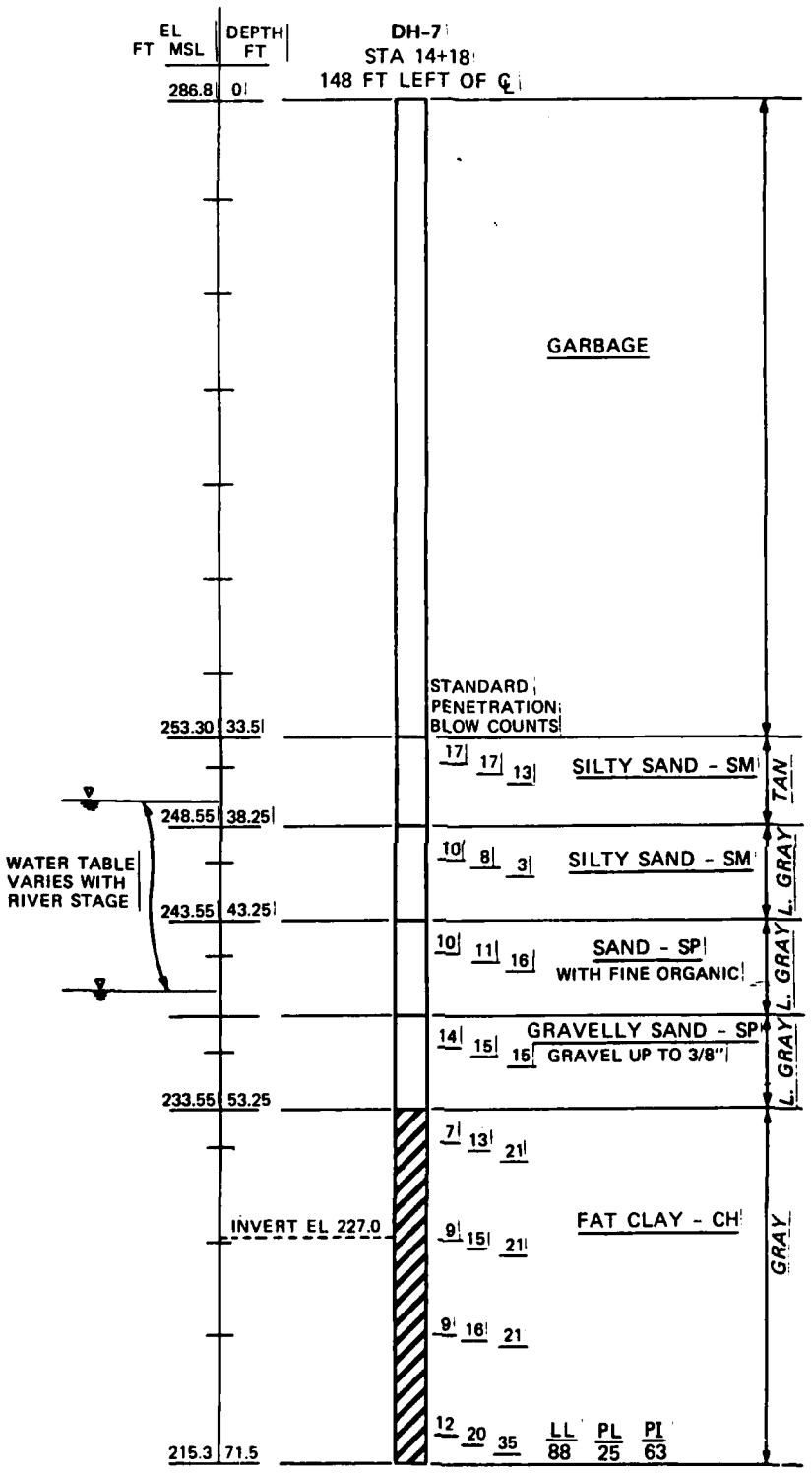


Figure 11. Boring profile from sample site DH-7

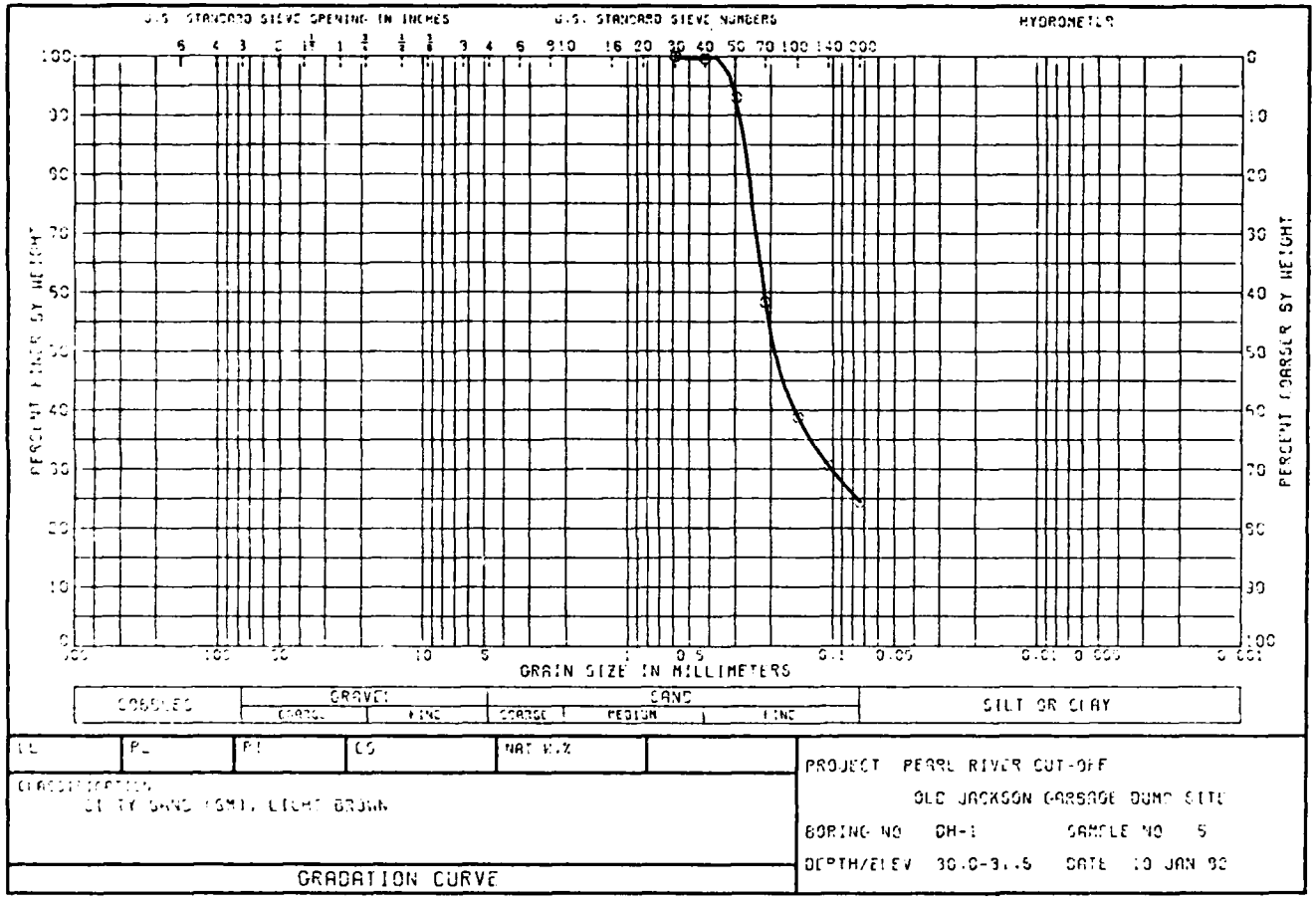


Figure 12. Aggregate grading curve for boring DH-1, depth 30.0 - 31.5

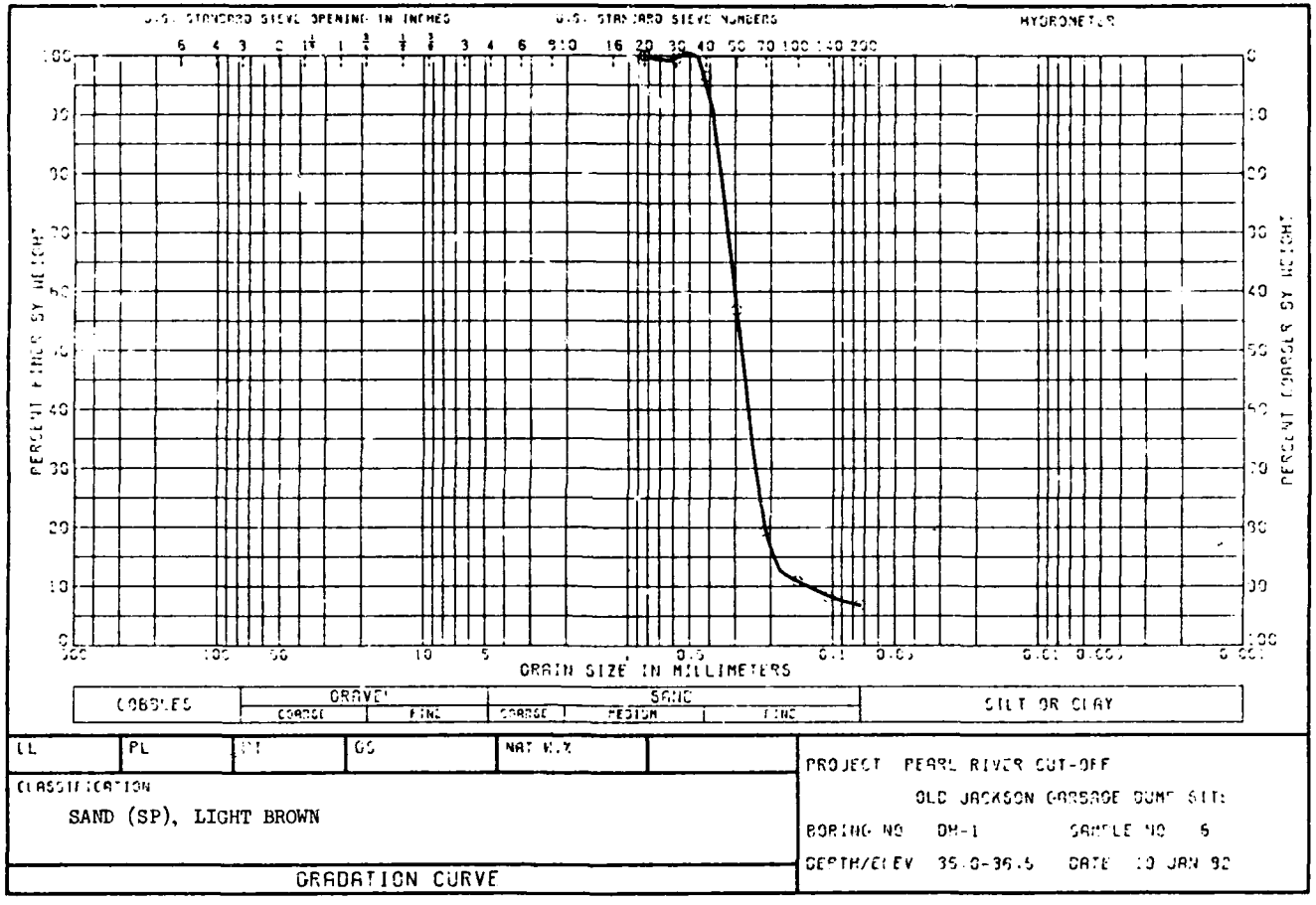


Figure 13. Aggregate grading curve for boring DH-1, depth 35.0 - 36.5

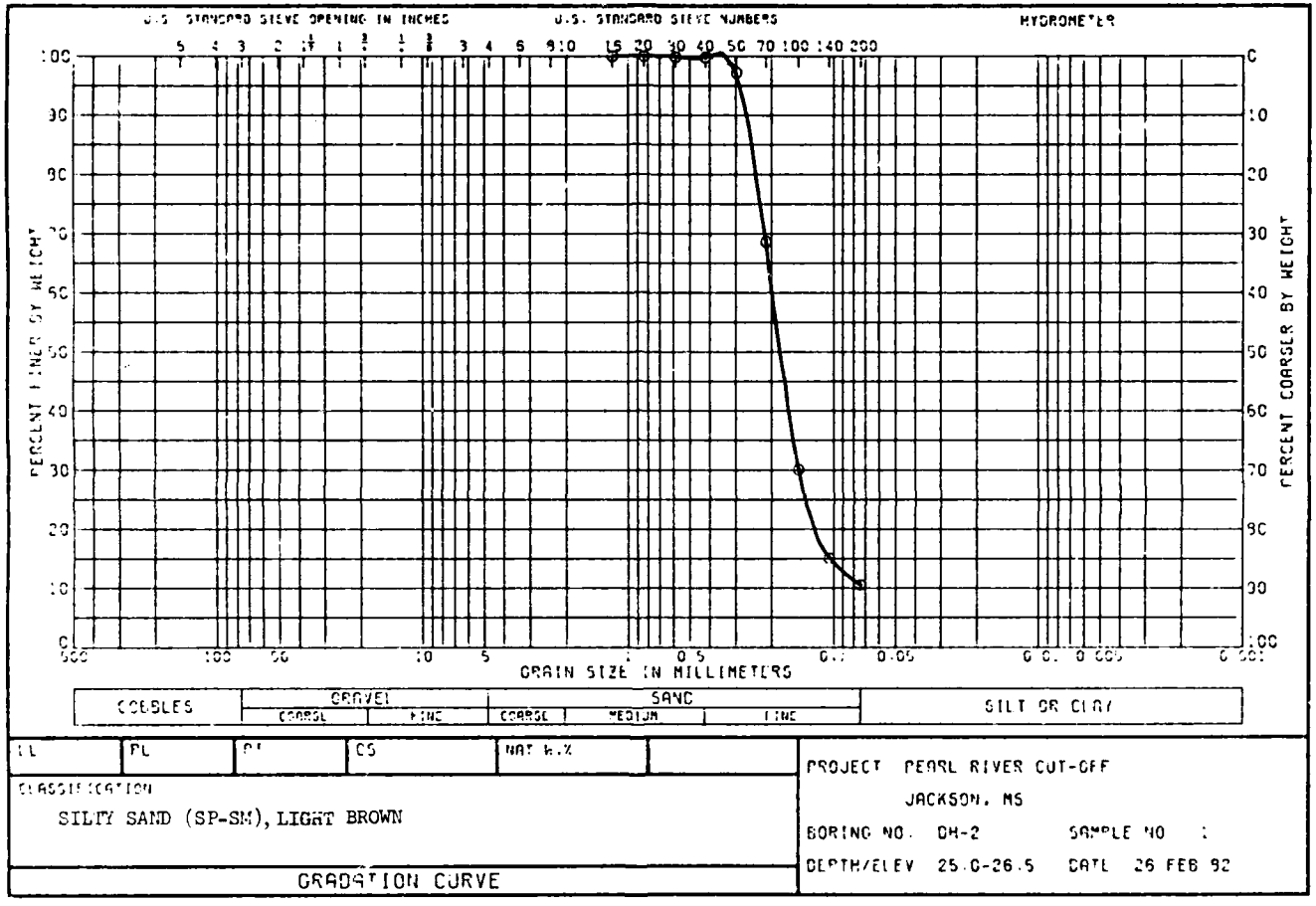


Figure 14. Aggregate grading curve for boring DH-2, dpeth 25.0 - 26.5

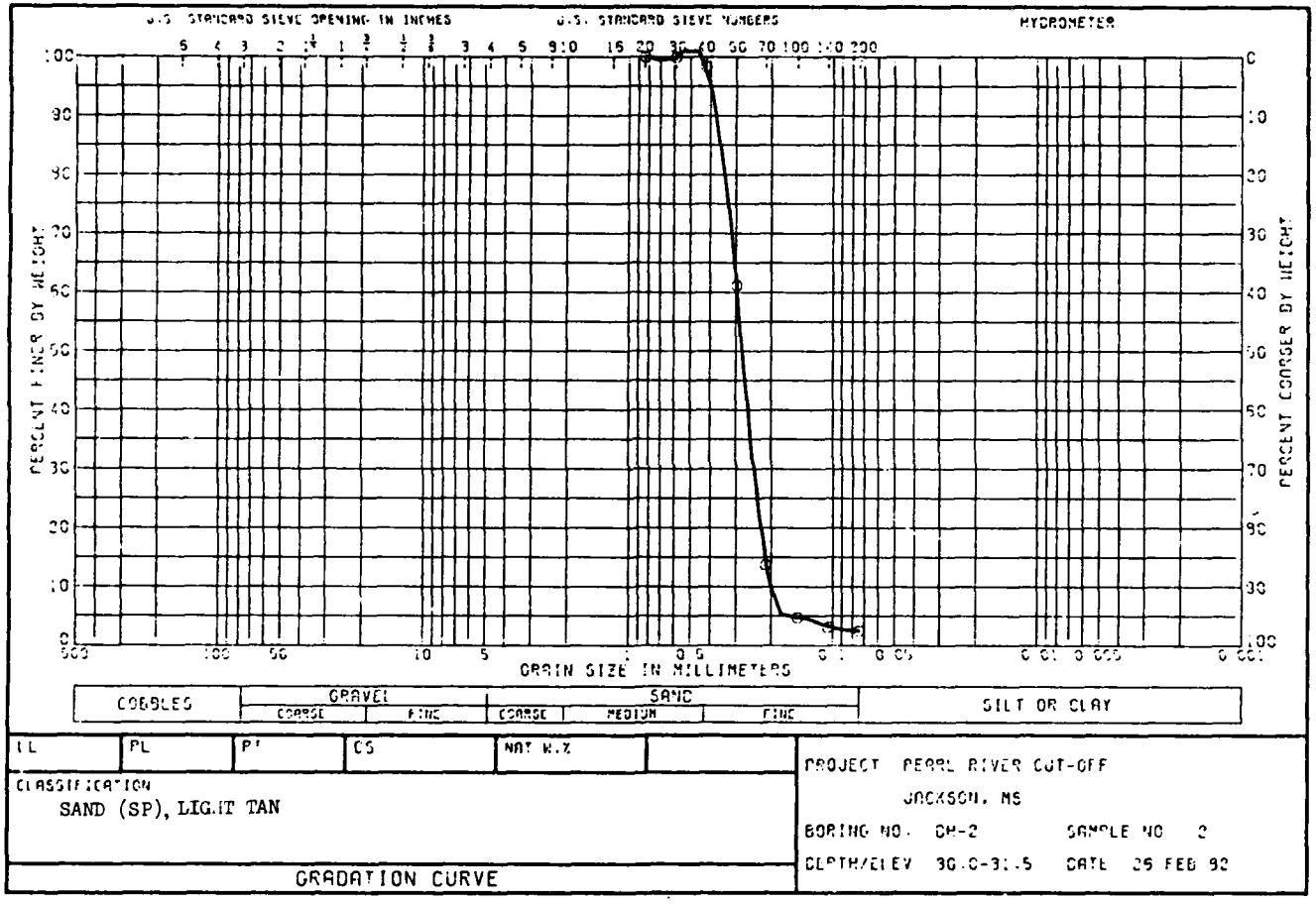


Figure 15. Aggregate grading curve for boring DH-2, depth 30.0 - 31.5

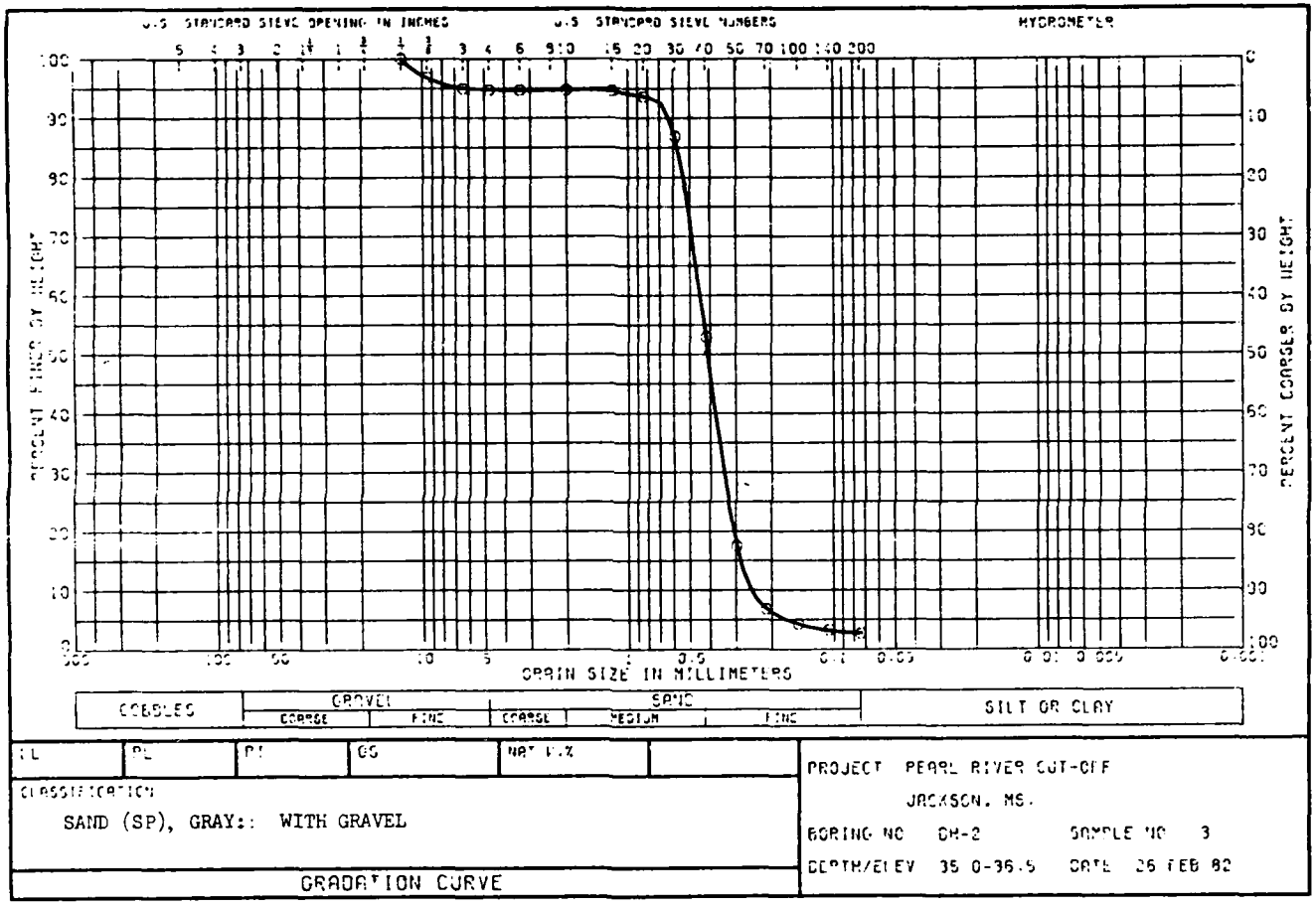


Figure 16. Aggregate grading curve for boring DH-2, depth 35.0 - 36.5

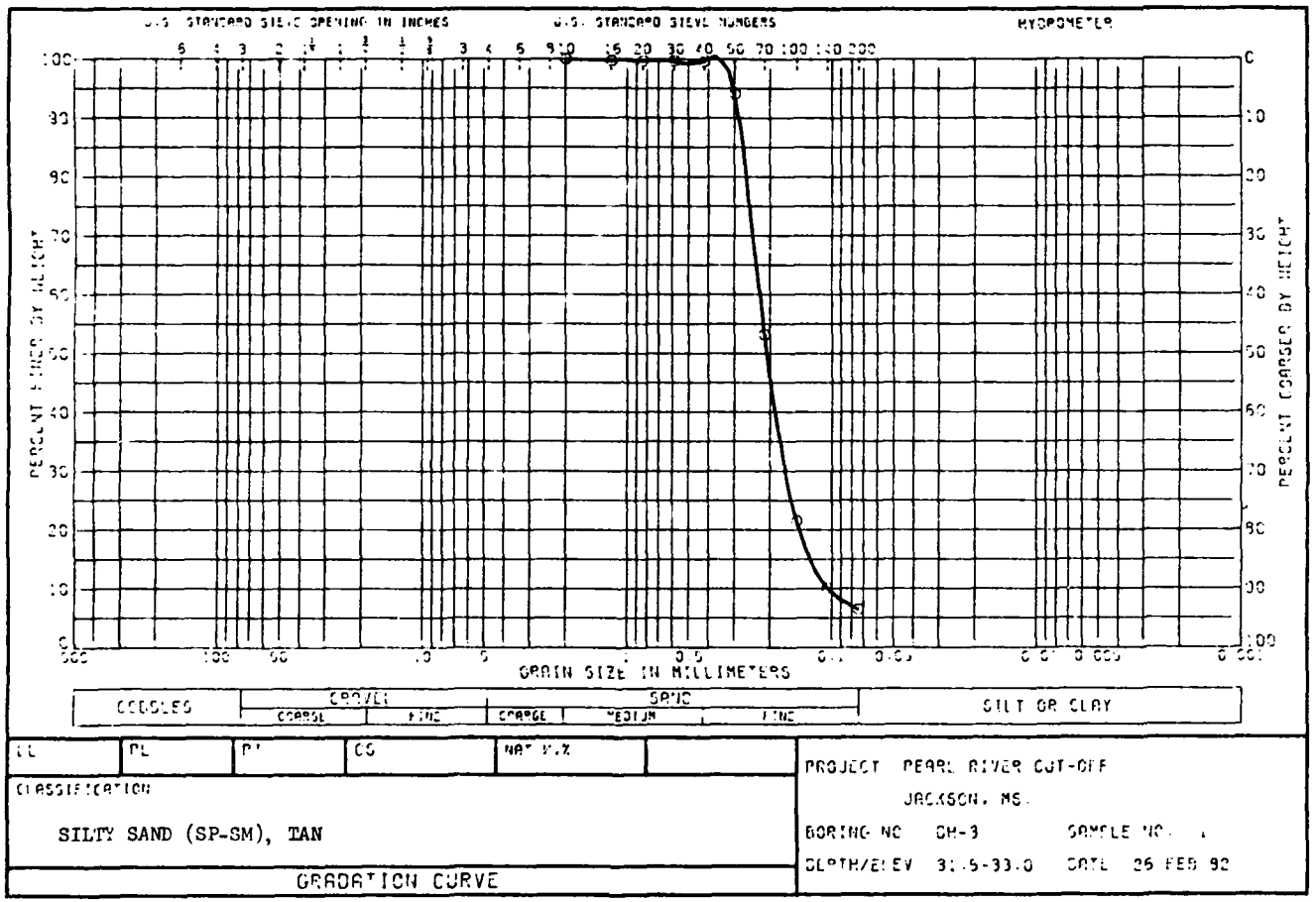


Figure 17. Aggregate grading curve for boring DH-3, depth 31.5 - 33.0

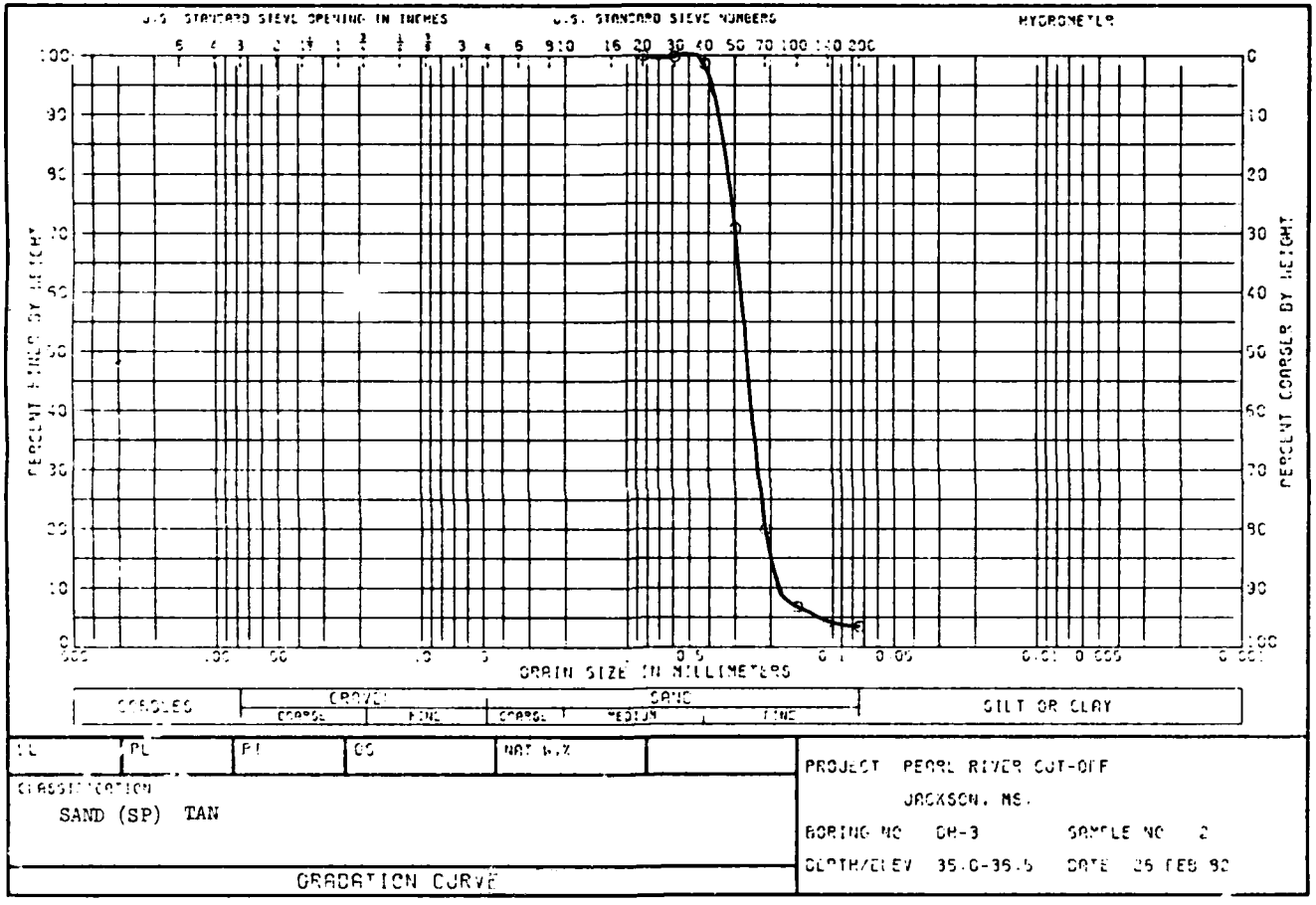


Figure 18. Aggregate grading curve for boring DH-3, depth 35.0 - 36.5

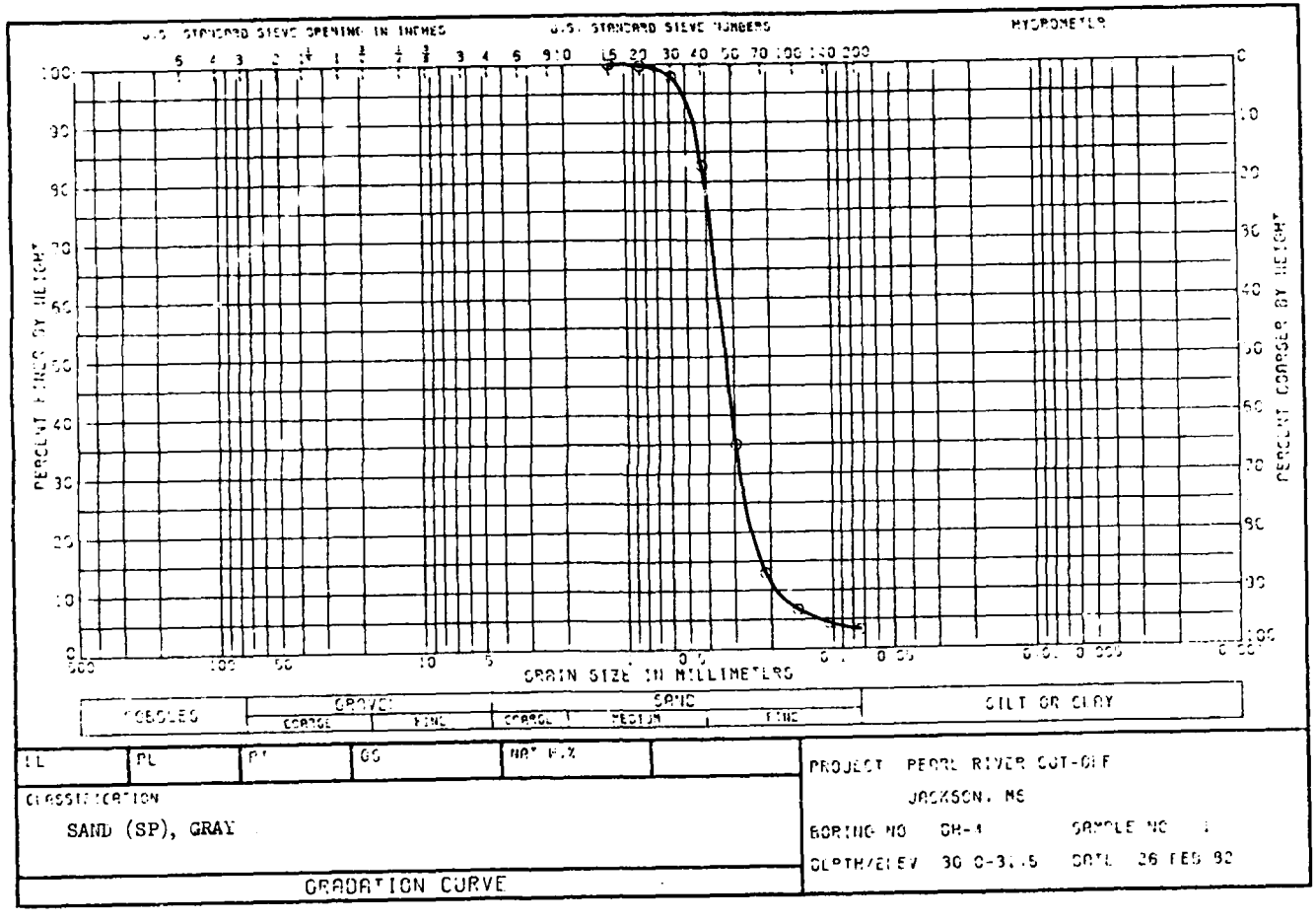


Figure 19. Aggregate grading curve for boring DH-4, depth 30.0 - 31.5

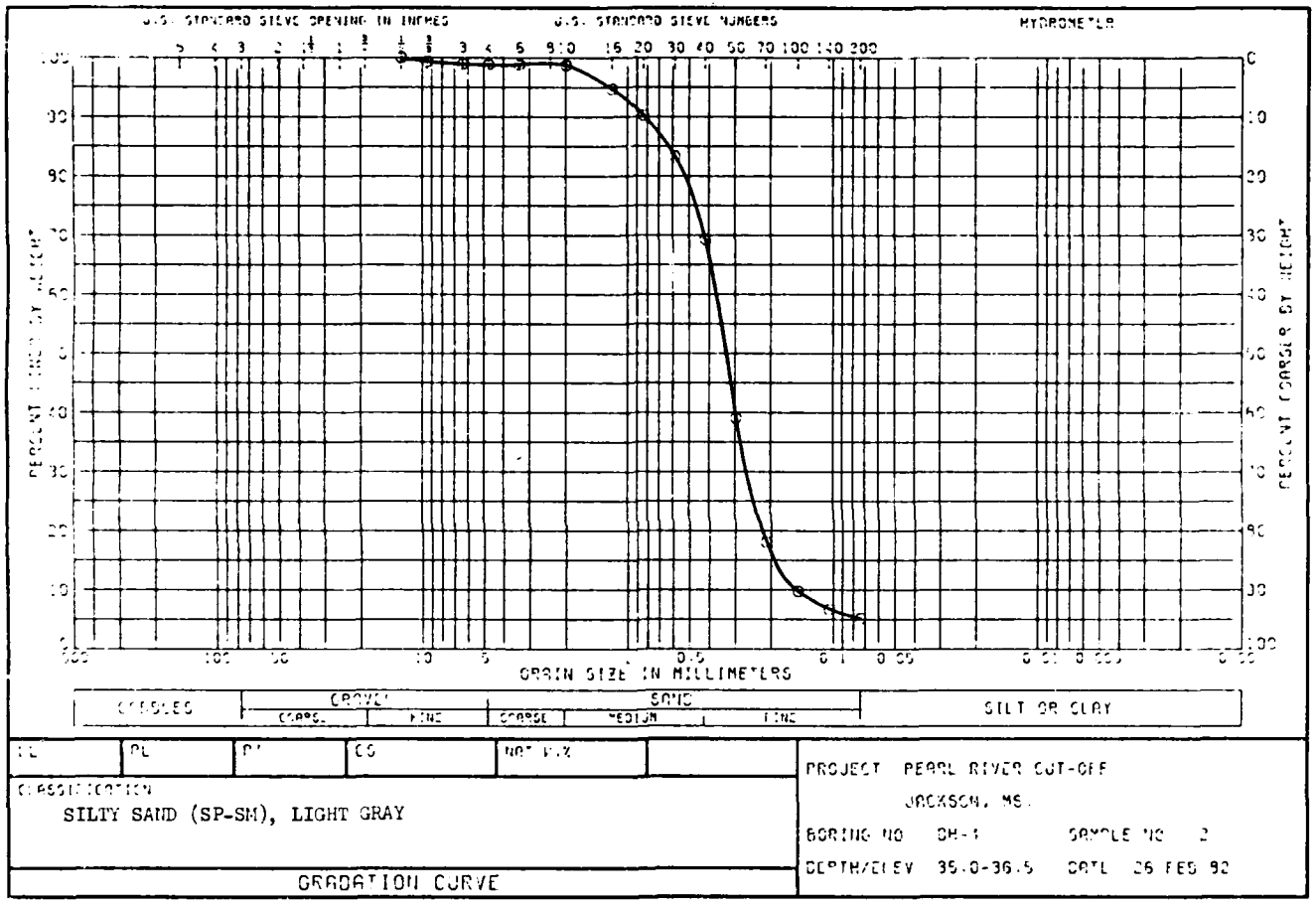


Figure 20. Aggregate grading curve for boring DH-4, depth 35.0 - 36.5

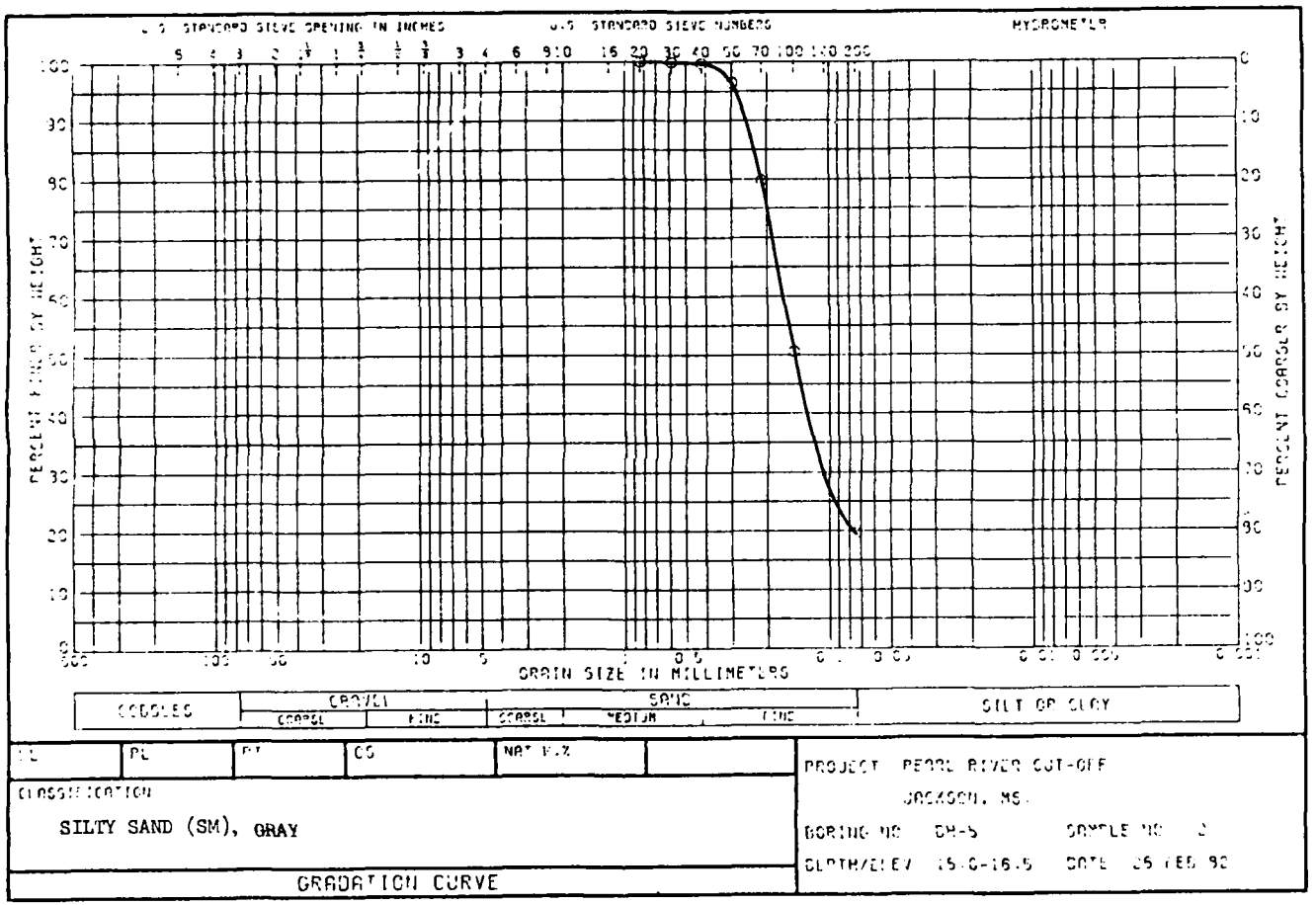


Figure 21. Aggregate grading curve for boring DH-5, depth 15.0 - 16.5

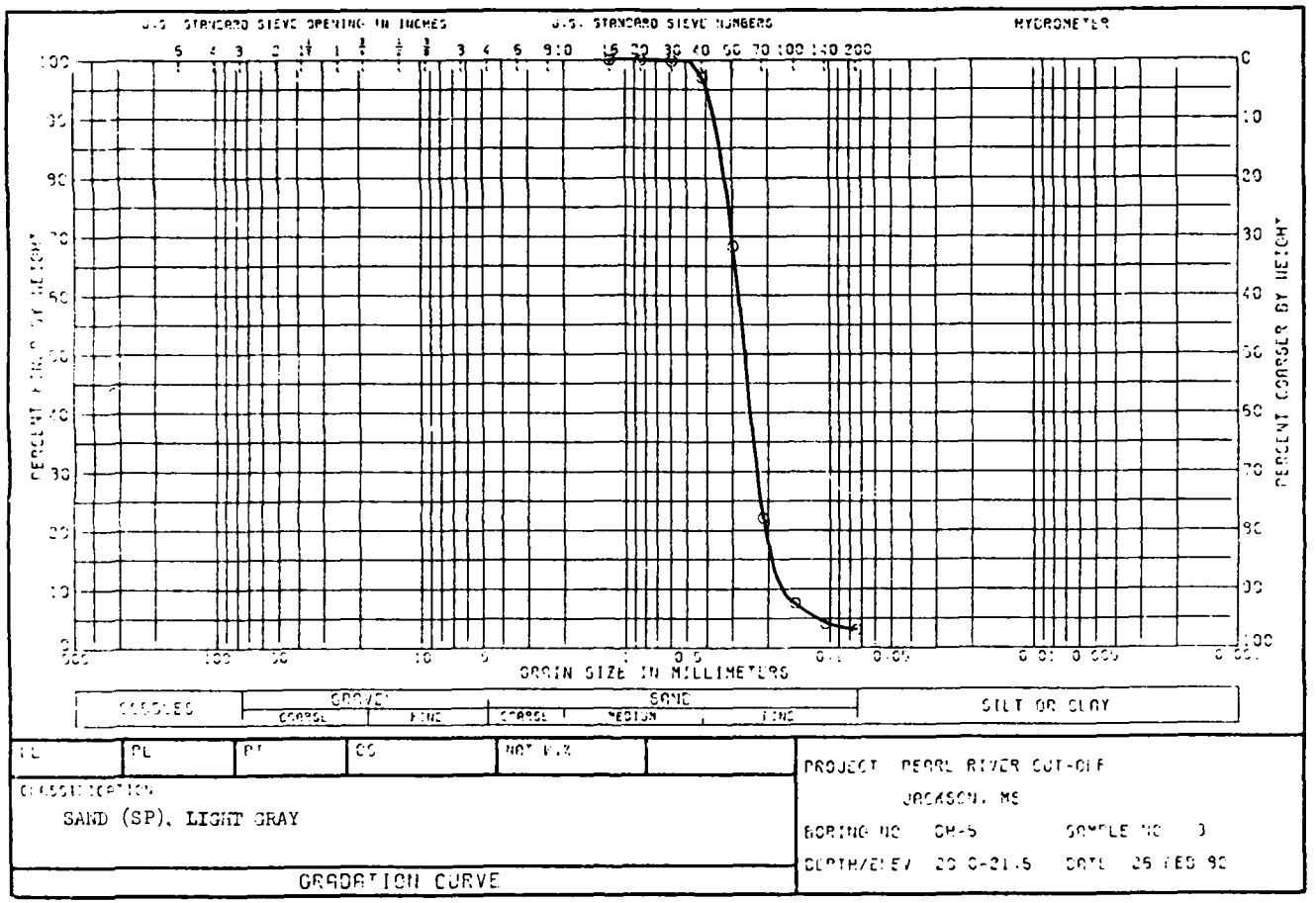


Figure 22. Aggregate grading curve for boring DH-5, depth 20.0 - 21.5

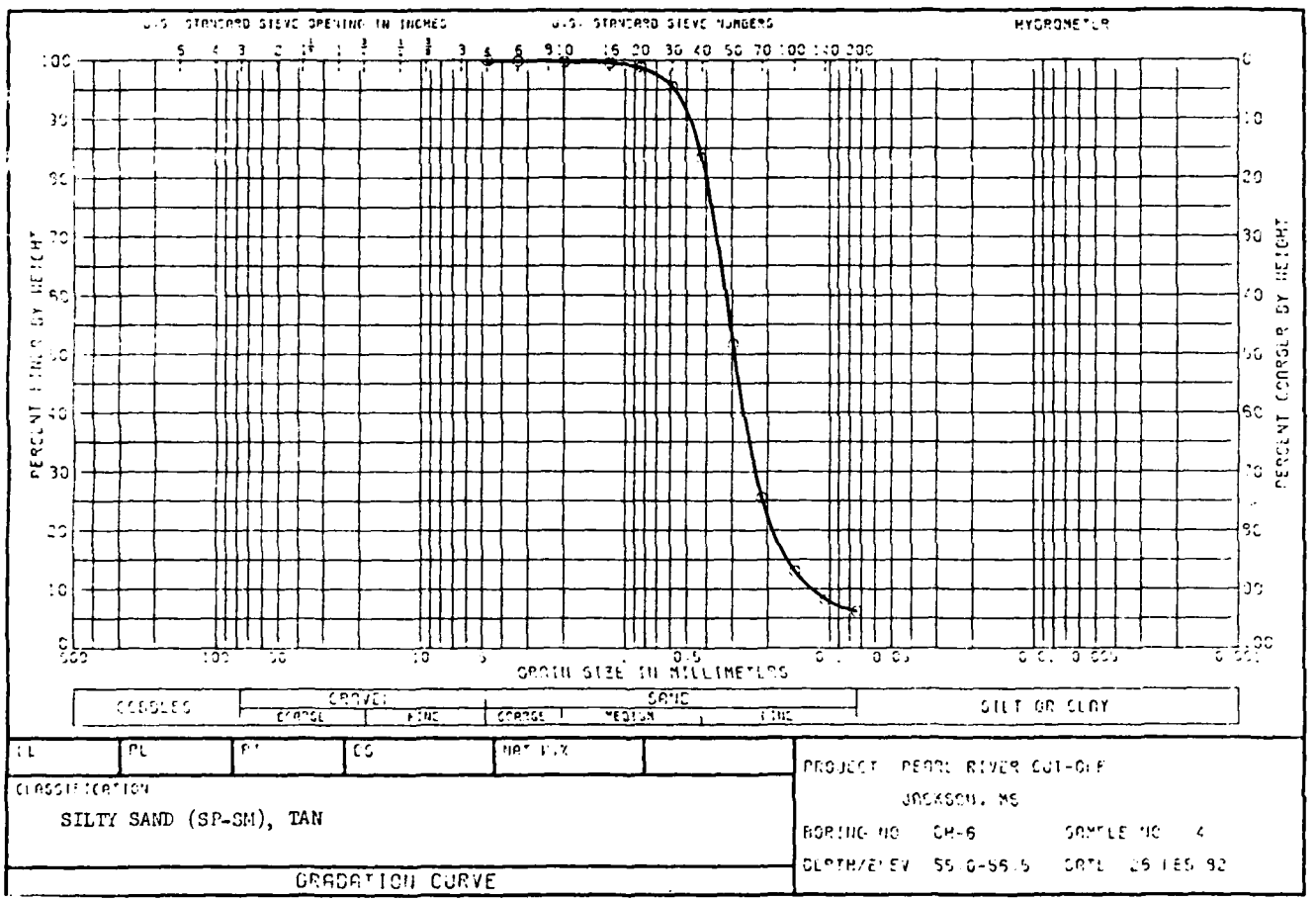


Figure 23. Aggregate grading curve for boring DH-6, depth 55.0 - 56.5

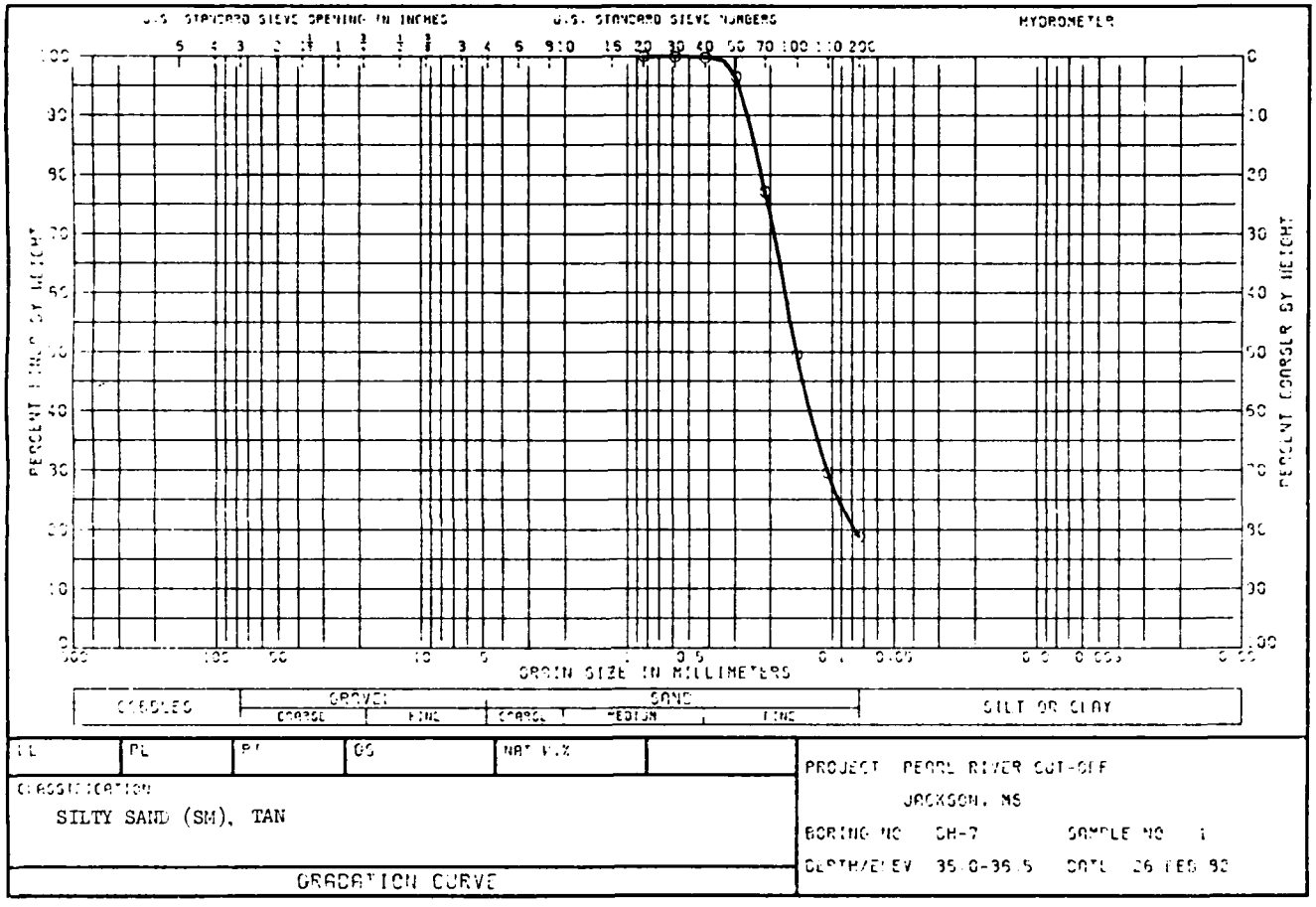


Figure 24. Aggregate grading curve for boring DH-7, depth 35.0 - 36.5

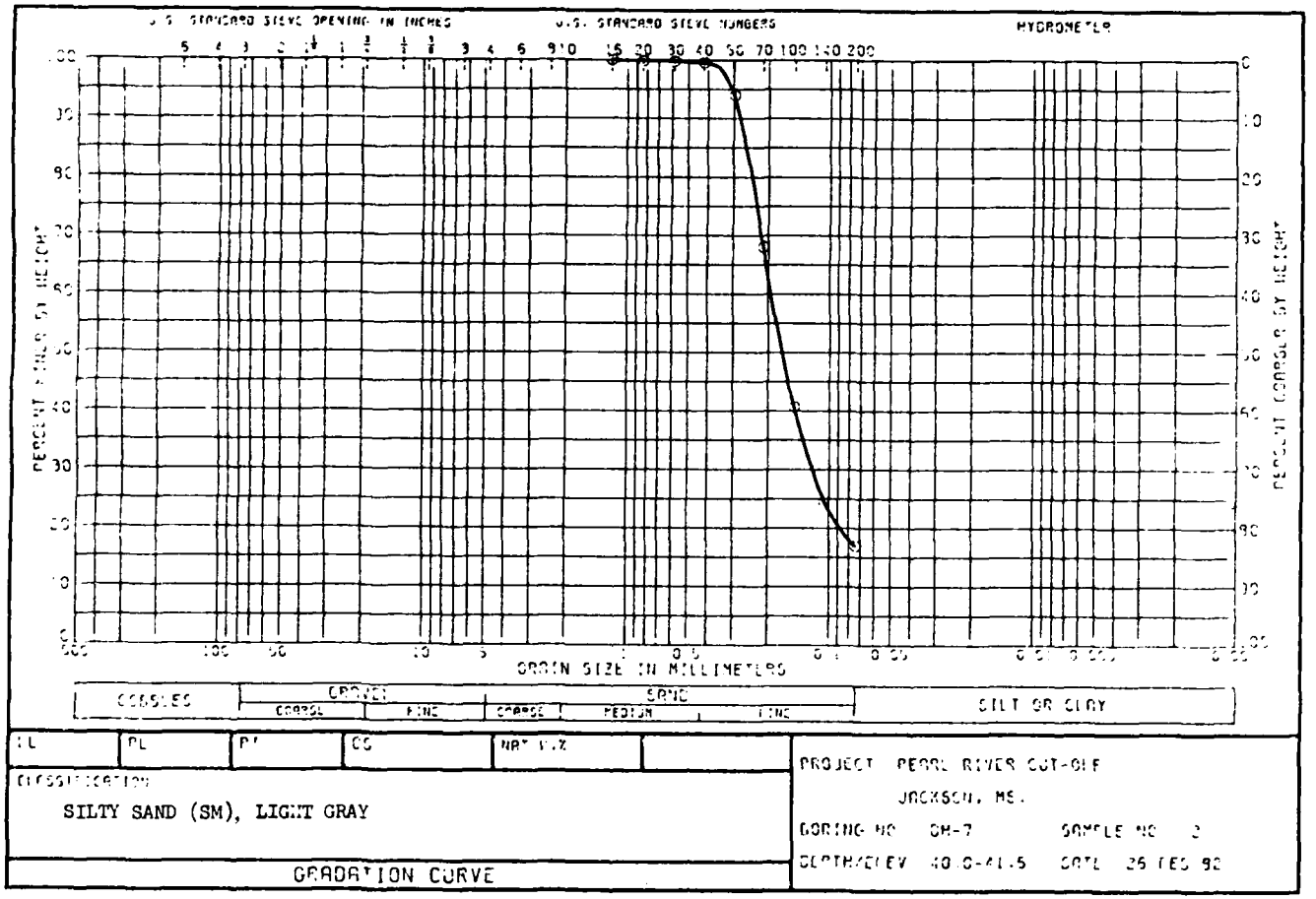


Figure 25. Aggregate grading curve for boring DH-7, depth 40.0 - 41.5

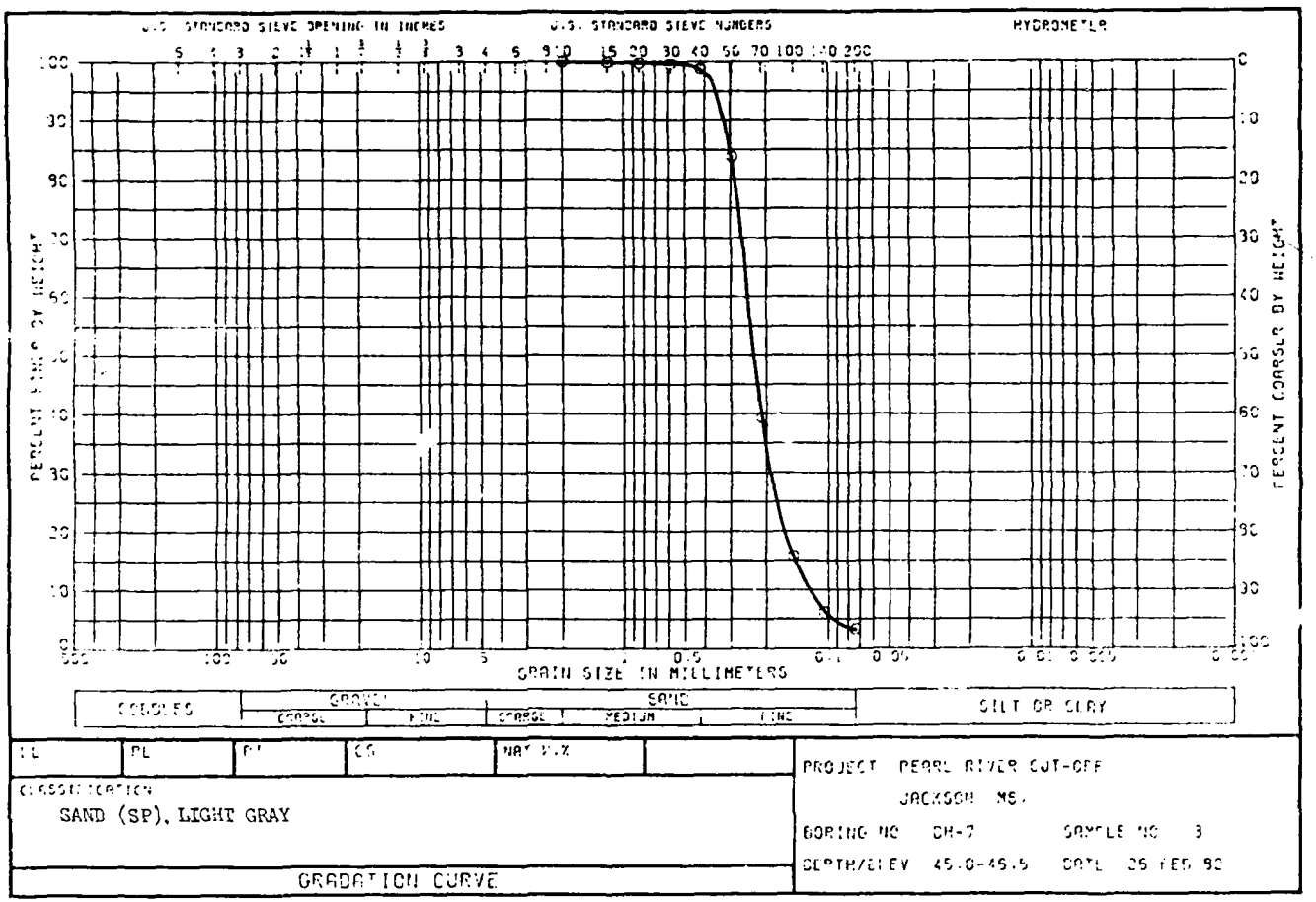


Figure 26. Aggregate grading curve for boring DH-7, depth 45.0 - 46.5

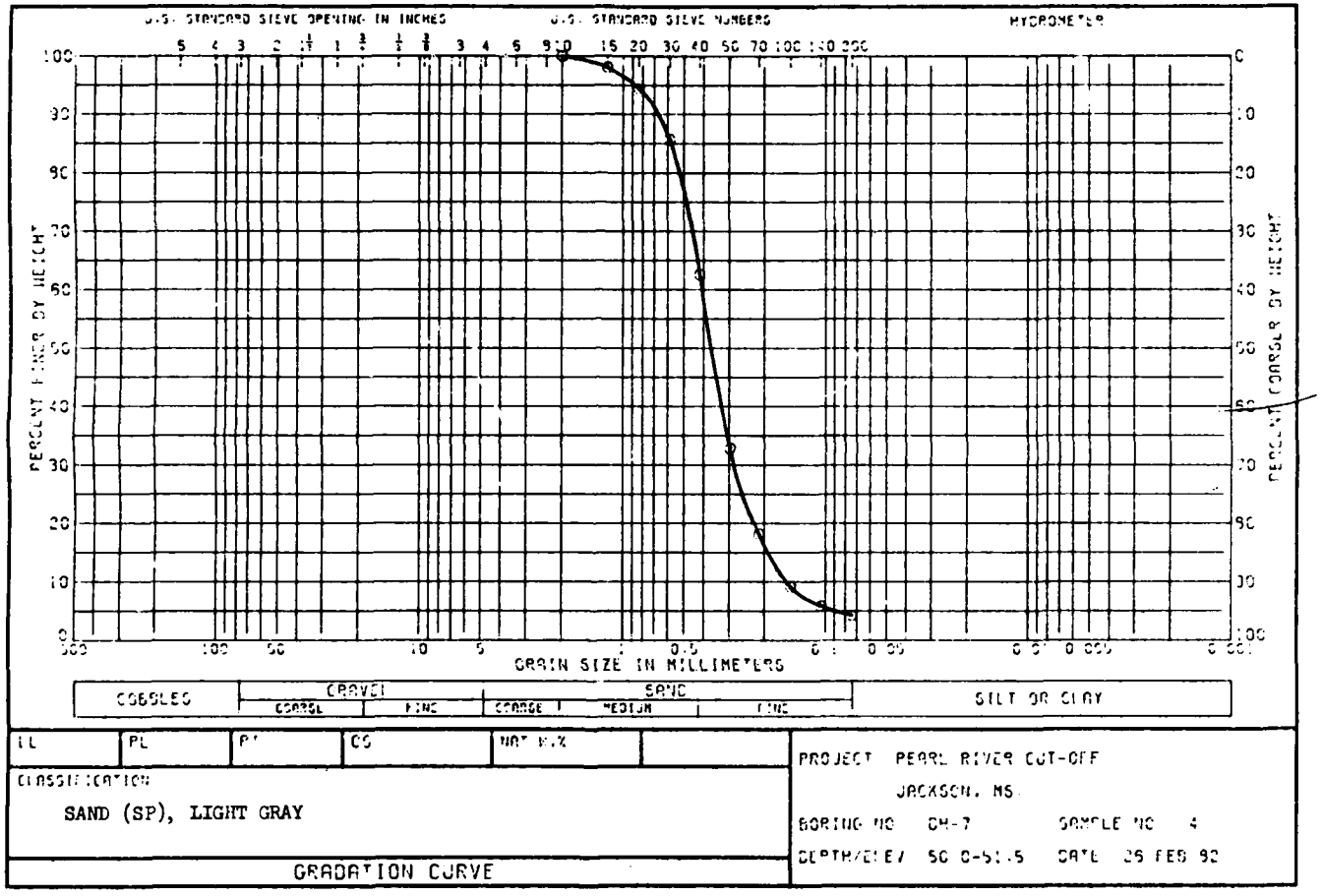


Figure 27. Aggregate grading curve for boring DH-7, depth 50.0 - 51.5

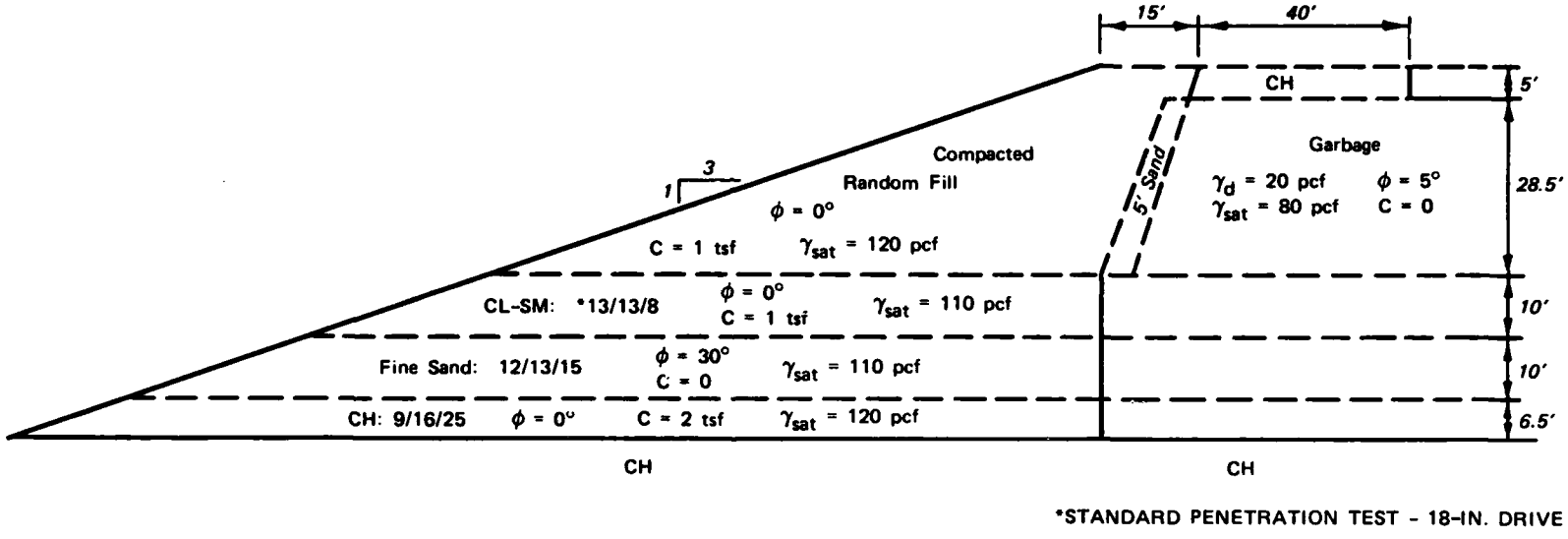


Figure 28. Cross-section configuration and soil parameters selected for stability analysis

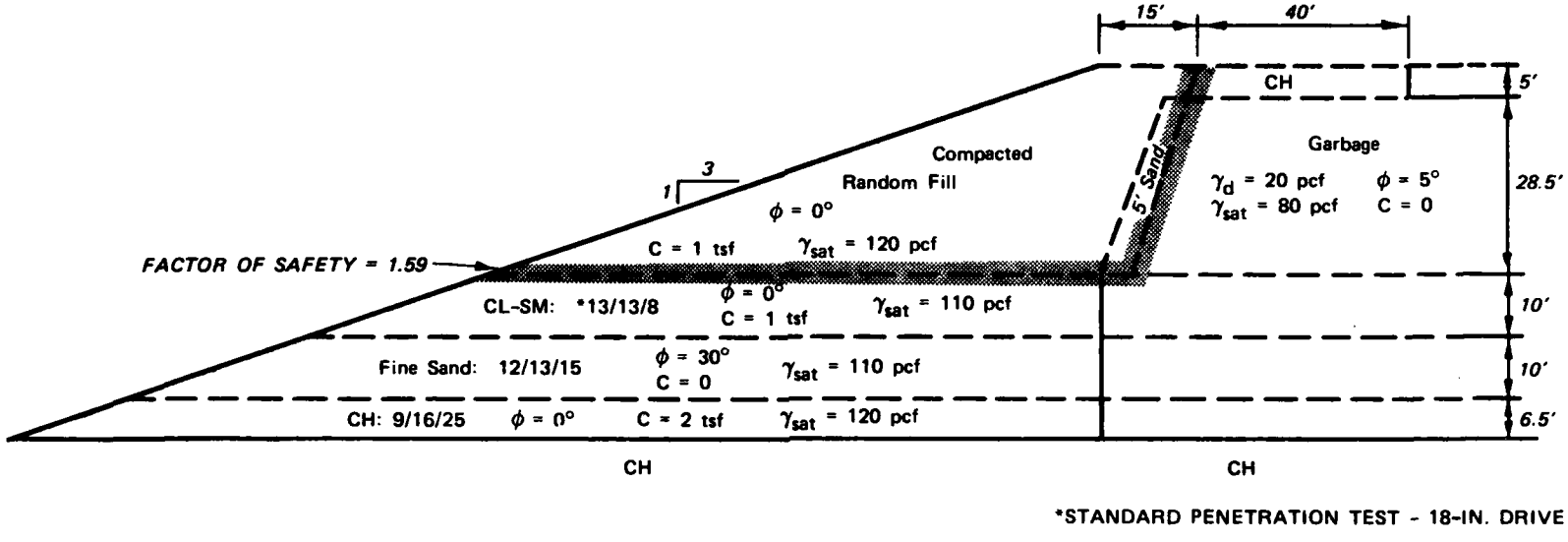


Figure 29. Stability analysis-wedge method-failure plane along bottom surface of garbage

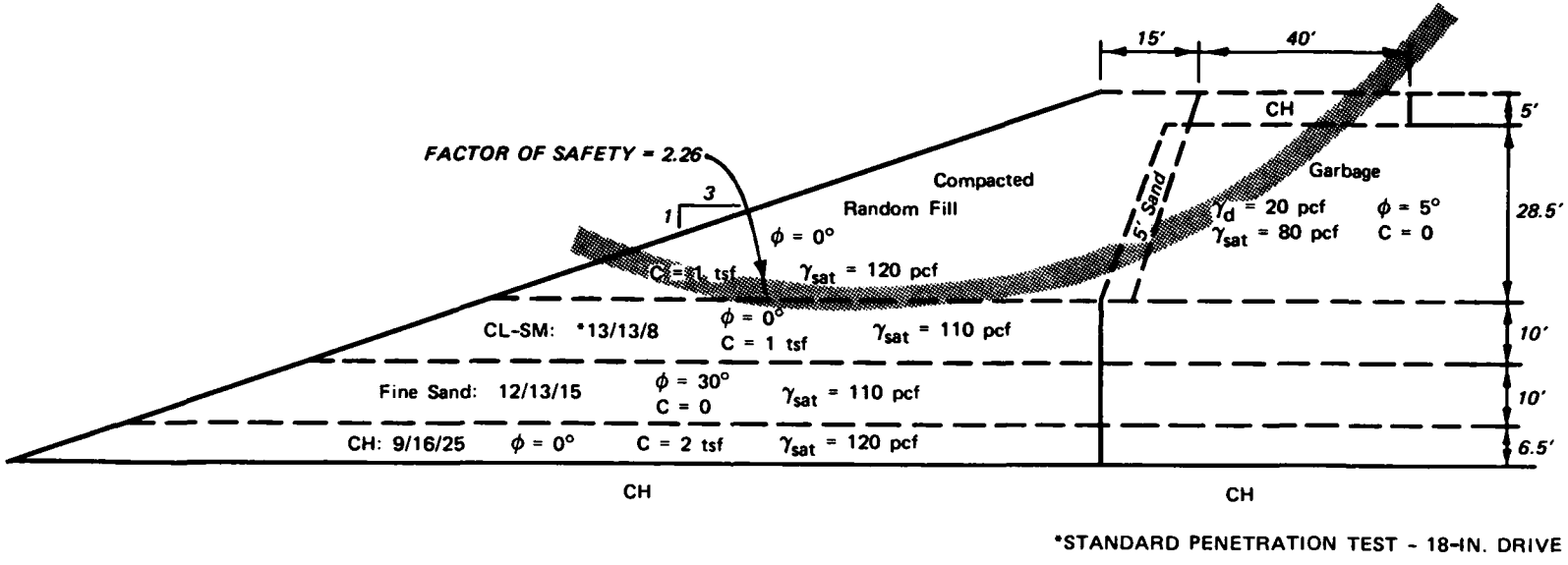


Figure 30. Stability analysis-wedge method-failure plane along bottom surface of garbage

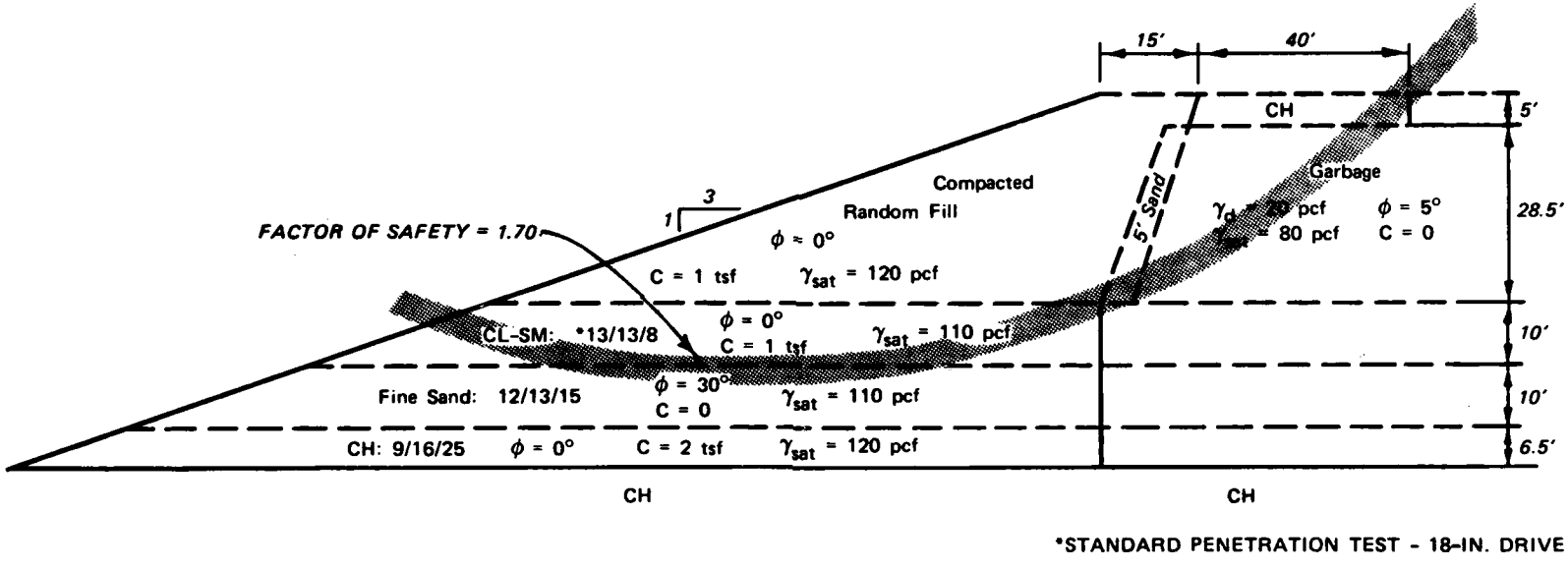


Figure 31. Stability analysis-arc method-tangent elevation at bottom surface of garbage

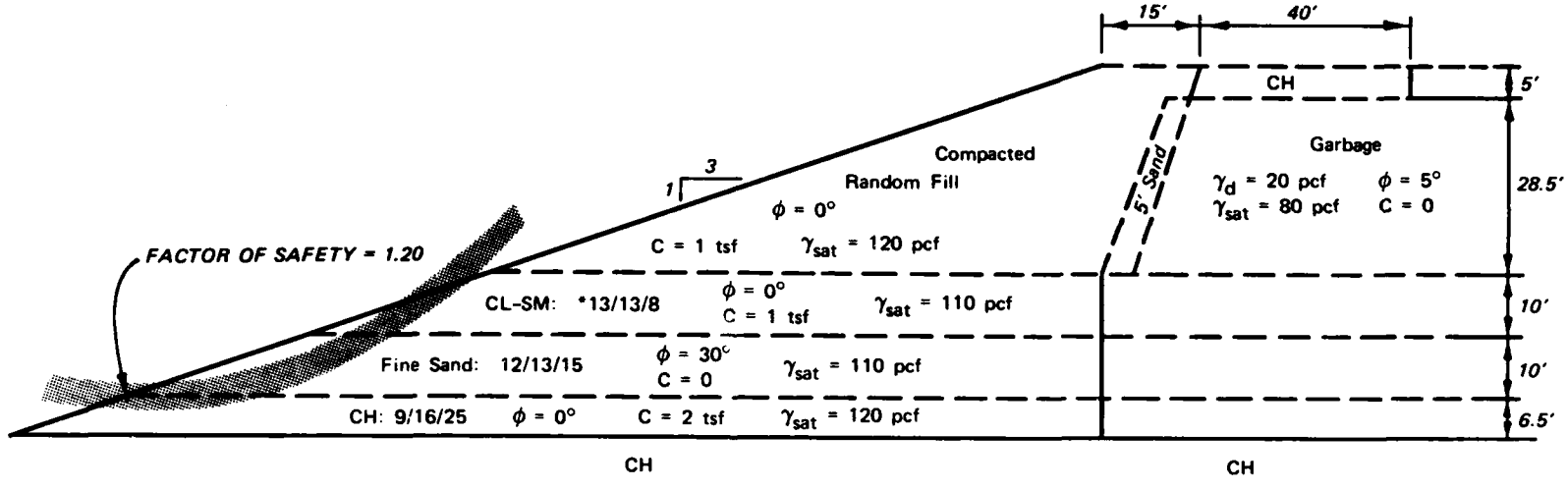


Figure 32. Stability analysis-arc method-tangent elevation at bottom surface of CL-SM layer

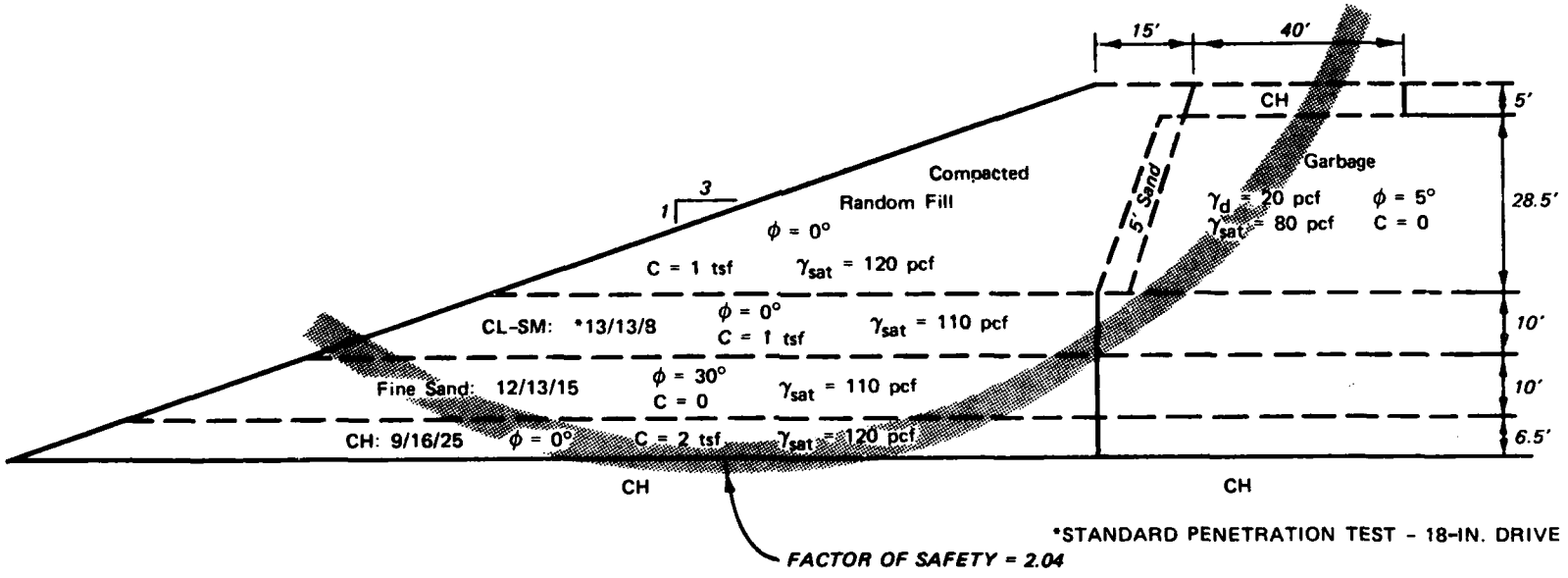


Figure 33. Stability analysis-arc method-tangent elevation at invert

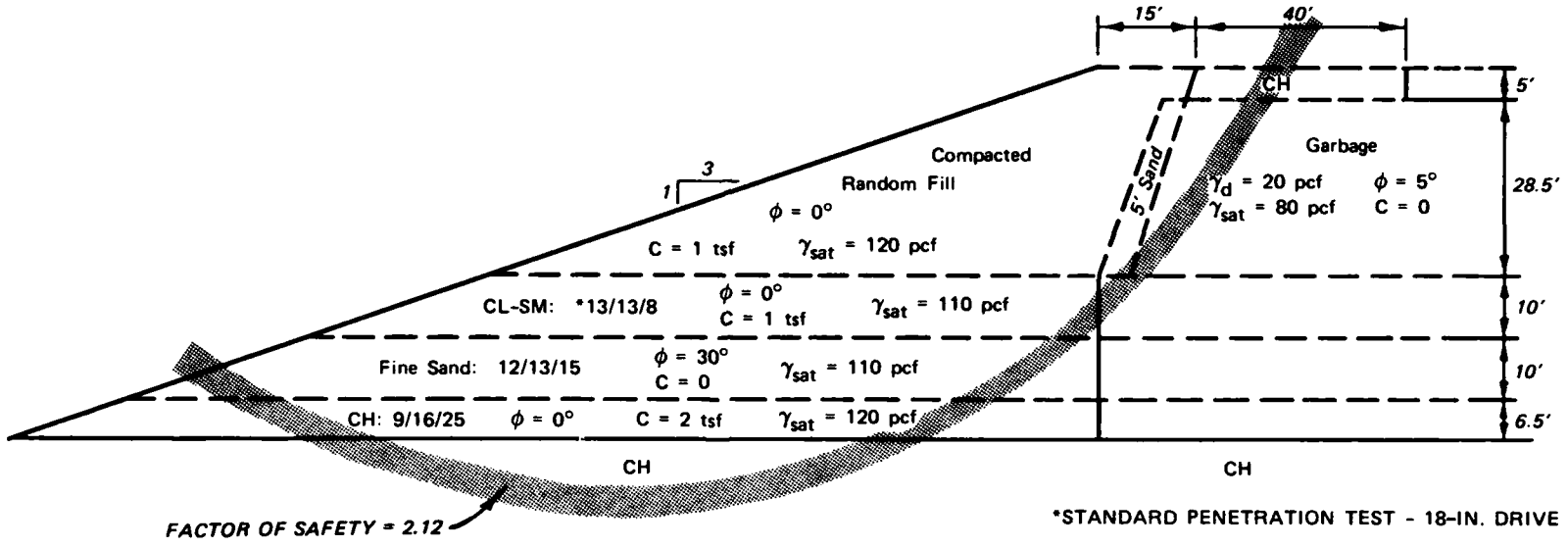
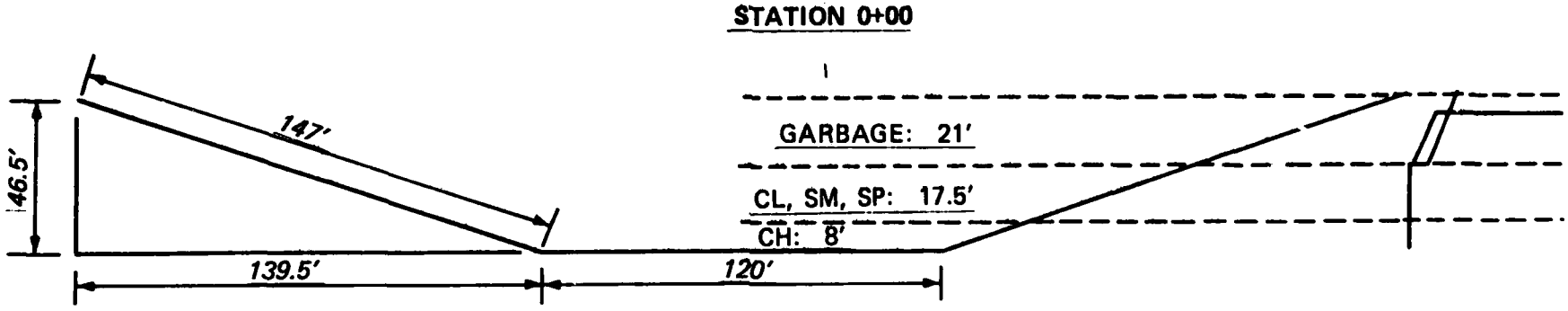


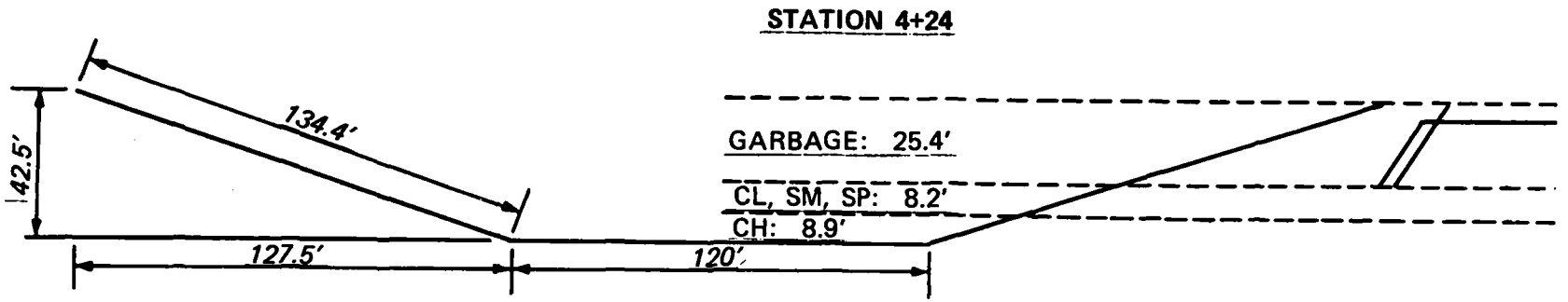
Figure 34. Stability analysis-arc method-tangent elevation 10 ft below invert



CUT

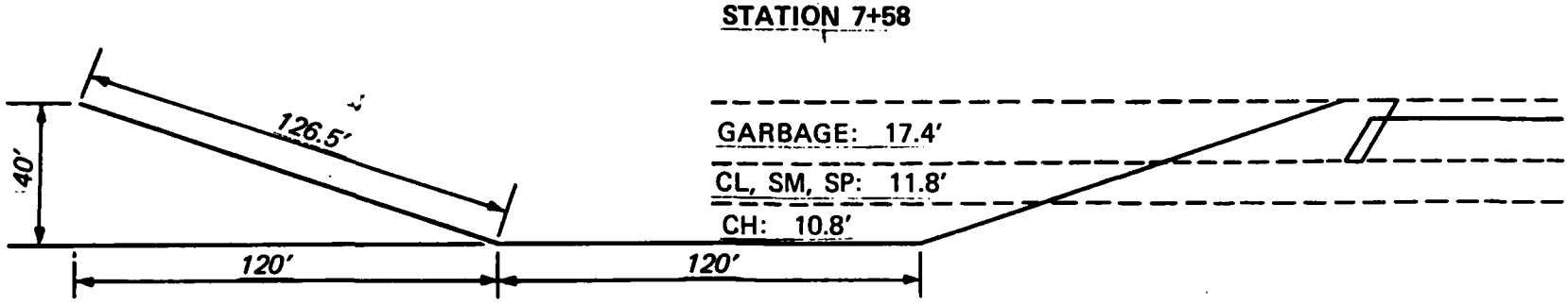
CH: 120 FT (8 FT) + 24 FT (8 FT) = 1,152 FT^2
CL, SM, SP: 168 FT (17.5 FT) + 52.5 FT (17.5 FT) = 3,859 FT^2
GARBAGE: 399 FT (21 FT) + 21 FT (10 FT) + 2 (23 FT) (5 FT) + 2 (40 FT) (5 FT) = 9,219 FT^2

Figure 35. Cross section and end areas for earthwork computations - station 0+00



CH: 120 FT (8.9 FT) + 26.7 FT (8.9 FT) = 1,306 FT^2
CL, SM, SP: 173.4 FT (8.2 FT) + 24.6 FT (8.2 FT) = 1,624 FT^2
GARBAGE: 375 FT (25.4 FT) + 10 FT (25.4 FT) + 30 FT (5 FT) (2 FT) + 2 FT (40 FT) (5 FT) = 10,479 FT^2

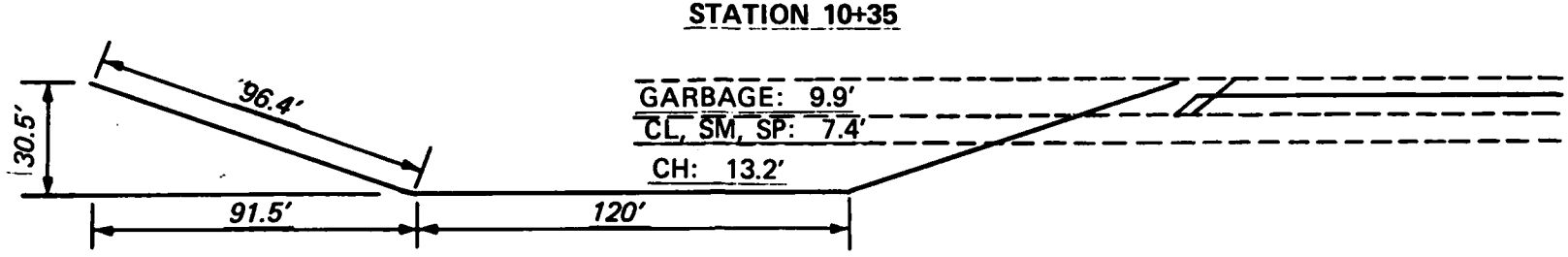
Figure 36. Cross section and end areas for earthwork computations - station 4+24



CUT

CH: 120 FT (10.8 FT) + 32.4 FT (10.8 FT) = 1,646 FT^2
CL, SM, SP: 185 FT (11.8 FT) + 35.4 FT (11.8 FT) = 2,601 FT^2
GARBAGE: 360 FT (17.4 FT) + 10 FT (17.4 FT) + 2 (20 FT) (5 FT) + 2 (40 FT) (5 FT) = 7,038 FT^2

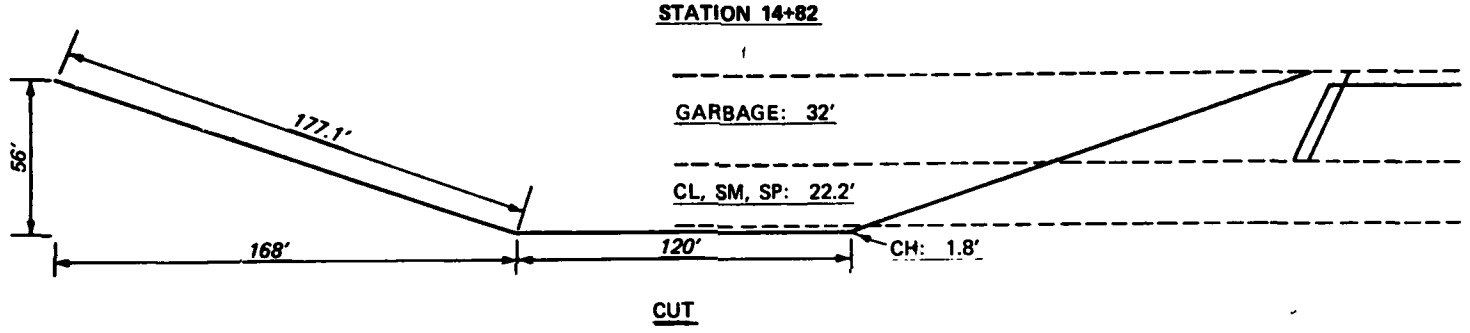
Figure 37. Cross section and end areas for earthwork computations - station 7+58



CUT

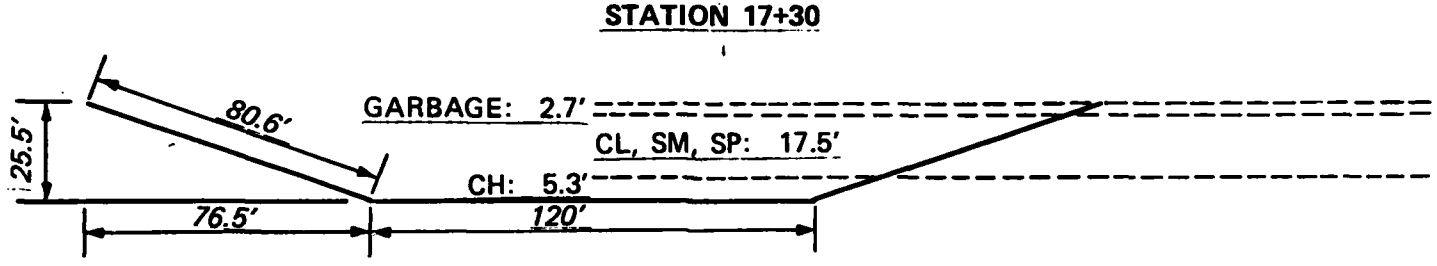
CH: 120 FT (13.2 FT) + 39.6 FT (13.2 FT) = 2,107 FT^2
CL, SM, SP: 199.3 FT (7.4 FT) + 22.2 FT (7.4FT) = 1,639 FT^2
GARBAGE: 303 FT (9.9 FT) + 10 FT (9.9 FT) + 2 (15 FT) (5 FT) + 2 (40 FT) (5 FT) = 3,649 FT^2

Figure 38. Cross section and end areas for earthwork computations - station 10+35



CH: 1.8 FT (120 FT) + 5.4 FT (1.8 FT) = 226 FT^2
CL, SM, SP: 130.8 FT (22.2 FT) + 66.6 FT (22.2 FT) = 4,382 FT^2
GARBAGE: 456 FT (32 FT) + 10 FT (32 FT) + 36 FT (5 FT) (2) + 2 (40 FT) (5 FT) = 15,672 FT^2

Figure 39. Cross section and end areas for earthwork computations - station 14+82



CH: 120 FT (5.3 FT) + 15.9 FT (5.3 FT) = 720 FT^2
CL, SM, SP: 151.9 FT (17.5 FT) + 52.5 FT (17.5 FT) = 3,577 FT^2
GARBAGE: 273 FT (2.7 FT) + 10 FT (2.7 FT) + 2 (10 FT) (5 FT) + 2 (40 FT) (5 FT) = 4,913 FT^2

Figure 40. Cross section and end areas for earthwork computations - station 17+30

APPENDIX A

SELECTED SAMPLE BORING LOGS FROM THE MISSISSIPPI HIGHWAY DEPARTMENT

Form BR :

MISSISSIPPI STATE HIGHWAY DEPARTMENT
TESTING DIVISION
SOIL BORING LOG

Hole No.: 25-03-6 (Co. No. - Site No. - Hole No.) **Sheet** 1 of 1
Project No.: I-I-55-2(9)91 [4.1] **County:** Hinds **District No.:** 5
Station No.: 70+00 **Offset:** & Svy **Prop. Owner:** J. S. Hudson
Date Started: 10-31-63 **Date Completed:** 10-31-63 **Sampler Type:** Split Spoon
Surface Elev.: 262.4 **Hole Depth:** 50'5" **Sampler Hammer: Weight:** 140 **Type:** Var
Casing Length: — **Drilled by:** [illegible]
Remarks: [illegible]
[illegible]
Water level on 11-4-63 = 14'

Data Submitted By: [illegible signature]

Sample Number	Depth	Elev.	S.S. Blows 6"	6"	6"	Log	Sample Description
							Brown, silty clay.
	-10'	252.4					
401-12 S.S.			11	19	22		Light brown, fine to medium grain sand.
	water level	11-4-63					
	-20'	242.4					
402-15 S.S.			5	14	19		Brown, medium to coarse grain damp sand.
	-30'	232.4					Sand & fine gravel — Top Cockfield
402-25 S.S.			6	13	22		Brown, carbonaceous clay with alternating layers of gray, fine sand
	-40'	222.4					
402-35 S.S.			11	15	23		
	-50'	212.4	5"				
402-45 S.S.			50	X	X		T.D. 50'5"
	-60'						
	-70'						
	-80'						

Legend: Sand; Clay or Shale; Mica; Glauconite; Lime or Chalk; Gravel; Organic Material; Fossiliferous; Silt; Marl

For

MISSISSIPPI STATE HIGHWAY DEPARTMENT
TESTING DIVISION
SOIL BORING LOG

Drill Unit No. E
Hole No.: 25-244-18 (Co. No. - Site No. - Hole No.) Sheet 1 of 1
Project No.: I-IG-55-2(8)41 County: Hinds District No.: 5
Station No.: 1378+85 Offset: 50' W. ℄ Prop. Owner:
Date Started: 6-19-64 Date Completed: 6-19-64 Sampler Type: Split Spoon
Surface Elev.: 256.3 Hole Depth: 41½' Sampler Hammer: Weight: 140 Type: Jar
Casing Length: — Drilled by: Bobby Wallace
Remarks: overflow - partly cloudy & hot. Pearl River channel change

Data Submitted By: J. W. Hoen

Sample Number	Depth	Elev.	S.S. Blows 6" 6" 6"	Log	Sample Description
					Brown, fine grain sand,
476-13.5					Brown, silty, iron oxide stained clay,
	-10'	246.3			Gray, medium grain, wet sand, small amount of fine gravel at base
	-20'	236.3			Top Cockfield Fm.
476-25.5					Brown, carbonaceous, silty clay with numerous lignite streaks
	-30'	226.3			
	-40'	216.3			
476-39.5					T.D. 41½'
	-50'				
	-60'				

Sand | Clay or Shale | Mica | Glauconite
Lime or Chalk | Gravel | Organic Material | Fossiliferous
Silt | Marl

Form 6-

MISSISSIPPI STATE HIGHWAY DEPARTMENT
TESTING DIVISION
SOIL BORING LOG

Hole No.: 61-205-7 (Co. No. - Site No. - Hole No.) Sheet: 1 of 1
Project No.: I-IG-55-2(8)91 Pt. II County: Rankin District No.: 5
Station No.: 25+00 Offset: ℄ Lt. Ln. Prop. Owner:
Date Started: 11-13-63 Date Completed: 11-13-63 Sampler Type: Split Spoon
Surface Elev.: 259.20 Hole Depth: 51½' Sampler Hammer: Weight: 140 Type: Jar
Casing Length: — Drilled by: Bobby Wells
Remarks: weather - clear & cool. Bridge foundation, Interstate over existing Pearl River and swamp. water table on 11-15-63 @ 10'

Data Submitted By: J. W. Green

Sample Number	Depth	Elev.	S.S. Blows 6"	6"	6"	Log	Sample Description
							Brown, clayey silt.
	-10'						Light brown, wet, medium grain sand.
406-6S.S.			13	13	17		
	-20'						
406-7S.S.			13	16	20		Top Moody's Branch Fm.
					3"		Blue-gray glauconitic, very limy, fossiliferous clay.
	-30'						Green-gray, very glauconitic, very limy, fossiliferous Marl.
406-8S.S.			16	29	30		Top Cockfield Fm.
	-40'						Alternating thin layers of brown, carbonaceous, clay & brown, carbonaceous, slightly micaceous silt.
406-9S.S.			10	20	37		
	-50'						
406-10S.S.			28	39	46		
							T.D. 51½'
	-60'						
	-70'						
	-80'						

Sand | Clay or Shale | Mica | Glauconite
Lime or Chalk | Gravel | Organic Material | Fossiliferous
Silt | Marl

APPENDIX B

WELL BORING LOGS W-1 THROUGH W-6

Hole No. W-1

DRILLING LOG | DIVISION

1. PROJECT: Pearl River Cut-off	INSTALLATION: Waterways Experiment Station; SHEET 1 OF 1 SHEETS
2. LOCATION (Coordinates or Station)	10. SIZE AND TYPE OF BIT: Hollow Stem Auger
	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
3. DRILLING AGENCY: Waterways Experiment Station	12. MANUFACTURER'S DESIGNATION OF DRILL: Failing
4. HOLE NO. (As shown on drawing title and file number): W-1	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 0; UNDISTURBED 0
5. NAME OF DRILLER: Clyde Drake	14. TOTAL NUMBER CORE BOXES: 0
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED --- DEG. FROM VERT.	15. ELEVATION GROUND WATER: 244.97 (7 Dec)
7. THICKNESS OF OVERBURDEN: 21.5 ft	16. DATE HOLE: STARTED 7 Dec 81; COMPLETED 8 Dec 81
8. DEPTH DRILLED INTO ROCK: ---	17. ELEVATION TOP OF HOLE: 256.97 ft (MSL)
9. TOTAL DEPTH OF HOLE: 21.5 ft	18. TOTAL CORE RECOVERY FOR BORING: 0 %
	19. SIGNATURE OF INSPECTOR: Charlie Whitten

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Descriptions) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
256.97			clay-brown, micaceous with roots in upper few inches			Hollow stem auger with a a wood-knock out plug in the bottom was used to install the well. The sand was allowed to collapse around the well screen when the auger was pulled out of the hole. An open auger was used to drill to the water table (12.0 ft).
254.47			silt-brown to gray, finely laminated			
252.97	5		silt-tan, clayey			
	10					
244.97			sand-gray to white, fine to medium silty sand, micaceous; silt and fine sand content decrease with depth.			
	15					
	20					
235.47			Bottom of hole at 21.5 ft			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: Pearl River Cut-off | HOLE NO. W-1

Hole No. W-2

DRILLING LOG

DIVISION

INSTALLATION: Waterways Experiment Station

SHEET 1 OF 1 SHEETS

1. PROJECT: Pearl River Cut-off
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY: Waterways Experiment Station
4. HOLE NO. (As shown on drawing title and file number): W-2
5. NAME OF DRILLER: Clyde Drake
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 22.0 ft
8. DEPTH DRILLED INTO ROCK: ---
9. TOTAL DEPTH OF HOLE: 22.0 ft
10. SIZE AND TYPE OF BIT: Hollow stem auger
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Failing
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED ---; UNDISTURBED ---
14. TOTAL NUMBER CORE BOXES: ---
15. ELEVATION GROUND WATER: 259.98 ft (8 Dec)
16. DATE HOLE: STARTED 8 Dec 81; COMPLETED 8 Dec 81
17. ELEVATION TOP OF HOLE: 268.98 ft (MSL)
18. TOTAL CORE RECOVERY FOR BORING: 0 %
19. SIGNATURE OF INSPECTOR: Charlie White

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
268.98			clay - brown, silty with grass roots in upper 0.5 ft			A hollow stem auger with a wood knock out plug in the bottom was used to install the well. The sand was allowed to collapse around the well screen when the auger was pulled. An open auger was used to drill to the water table, which was at the base of the silt (9. ft).
266.98			silt - brown to gray, finely laminated, clayey-silt; clay content decreases with depth			
	5					
259.48			sand - white, medium, micaceous			
	10					
	15					
	20					
246.98			Bottom of hole at 22.0 ft			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: Pearl River Cut-off | HOLE NO: W-2

Hole No. W-3

DRILLING LOG

DIVISION

INSTALLATION: Waterways Experiment Station

SHEET 1 OF 1 SHEETS

1. PROJECT: Pearl River Cut-off
2. LOCATION (Coordinates or Station): 17+35 41 ft E of ℄
3. DRILLING AGENCY: Waterways Experiment Station
4. HOLE NO. (As shown on drawing title and title number): W-3
5. NAME OF DRILLER: Clyde Drake
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 31.0 ft
8. DEPTH DRILLED INTO ROCK: ---
9. TOTAL DEPTH OF HOLE: 31.0 ft
10. SIZE AND TYPE OF BIT: Hollow stem auger
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Failing
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED ---; UNDISTURBED ---
14. TOTAL NUMBER CORE BOXES: ---
15. ELEVATION GROUND WATER: 240.80 ft (11 Dec)
16. DATE HOLE: STARTED 11 Dec 81; COMPLETED 12 Dec 81
17. ELEVATION TOP OF HOLE: 254.80 ft (MSL)
18. TOTAL CORE RECOVERY FOR BORING: --- %
19. SIGNATURE OF INSPECTOR: Charlie Waller

ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
254.80			sandy - silt, brown (pushed over site by bulldozer)			Drilled with hollow stem auger, pulled auger and used 6" steel casing to place gravel pack around well screen.
252.80			silt - tan to brown, finely laminated with some fine sand; increase in size and quantity of sand with depth			
	5					
	10					
	15					
239.30			sand - gray, fine, silty sand with scattered silt lenses; wood fragments up to 2" long scattered throughout; pea gravel a few inches thick at base			An open auger was used to drill to the water table (15.4 ft).
	20					
232.30			clay - green, fossilferous; stiff, plastic (Yazoo clay)			
	25					
227.42			Bottom of hole at 27.38 ft			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT)

PROJECT: Pearl River Cut-off

HOLE NO. W-3

Hole No. W-4

DRILLING LOG | DIVISION

INSTALLATION: Waterways Experiment Station | SHEET 1 OF 1 SHEETS

1. PROJECT: Pearl River Cut-off
2. LOCATION (Coordinates or Station): 14 + 42 on ℄
3. DRILLING AGENCY: Waterways Experiment Station
4. HOLE NO. (As shown on drawing title and file number): W-4
5. NAME OF DRILLER: Clyde Drake
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 44.0 ft
8. DEPTH DRILLED INTO ROCK: ---
9. TOTAL DEPTH OF HOLE: 44.0 ft
10. SIZE AND TYPE OF BIT: Hollow stem auger
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Failing
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED ---; UNDISTURBED ---
14. TOTAL NUMBER CORE BOXES: ---
15. ELEVATION GROUND WATER: 248.23 ft (15 Dec)
16. DATE HOLE: STARTED 14 Dec 81; COMPLETED 16 Dec 81
17. ELEVATION TOP OF HOLE: 281.63 ft (MSL)
18. TOTAL CORE RECOVERY FOR BORING: 0 %
19. SIGNATURE OF INSPECTOR: Charles Walter

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
281.63			garbage with a 1 ft clay soil cover			Used an open face auger to water table (33.4 ft) then a sand bailer to install 6" steel casing to the top of the Yazoo clay at 44.0 ft.
255.63	25					
254.63			clay - brown, plastic sand - gray, fine to medium silty sand; pea gravel in the bottom 1 to 2 ft.			
237.63	40		Bottom of hole at 44.0 ft Top of Yazoo clay			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: Pearl River Cut-off | HOLE NO. W-4

Hole No. W-5

DRILLING LOG | DIVISION

INSTALLATION: Waterways Experiment Station | SHEET 1 OF 1 SHEETS

1. PROJECT: Pearl River Cut-off
2. LOCATION (Coordinates or Station): 5 + 92 5 ft west of ℄
3. DRILLING AGENCY: Waterways Experiment Station
4. HOLE NO. (As shown on drawing title and title number): W-5
5. NAME OF DRILLER: Clyde Drake
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 31.5 ft
8. DEPTH DRILLED INTO ROCK: ---
9. TOTAL DEPTH OF HOLE: 31.5 ft
10. SIZE AND TYPE OF BIT: Hollow stem auger
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Failing
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED ---; UNDISTURBED ---
14. TOTAL NUMBER CORE BOXES: 0
15. ELEVATION GROUND WATER: 246.00 ft (16 Dec)
16. DATE HOLE: STARTED 16 Dec 81; COMPLETED 17 Dec 81
17. ELEVATION TOP OF HOLE: 262.90 ft (MSL)
18. TOTAL CORE RECOVERY FOR BORING: 0 %
19. SIGNATURE OF INSPECTOR: Charles Walker

ELEVATION ft, MSL (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
262.90	0		garbage with a 1.0 ft clay soil cover			Used hollow stem auger to drill the hole. Woman's stocking placed around well screen to keep fine grain material out of PVC pipe. Silt allowed to collapse around the well screen as auger pulled out of hole. The hole was drilled under a power line, so the mast was not raised. Water table at 16.9 ft.
252.50	10		silt-gray with some fine sand, changes to tan color below the water table (16.9 ft); pea gravel <1 ft thick at the base of the silt			
233.90	30		clay-green, fossiliferous, stiff, plastic (Yazoo clay)			
231.40			Bottom of hole at 31.5 ft			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: Pearl River Cut-off | HOLE NO. W-5

Hole No. W-6

DRILLING LOG

DIVISION

INSTALLATION: Waterways Experiment Station — SHEET 1 OF 1 SHEETS

1. PROJECT: Pearl River Cut-off
2. LOCATION (Coordinates or Station): 3 + 32 on ℄
3. DRILLING AGENCY: Waterways Experiment Station
4. HOLE NO. (As shown on drawing title and file number): W-6
5. NAME OF DRILLER: A. McNamara
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 42.0 ft
8. DEPTH DRILLED INTO ROCK: ---
9. TOTAL DEPTH OF HOLE: 42.0 ft
10. SIZE AND TYPE OF BIT: Hollow stem auger
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Failing
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 0; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: 0
15. ELEVATION GROUND WATER: 244.53 ft (19 Dec)
16. DATE HOLE: STARTED 19 Dec 81; COMPLETED 21 Dec 81
17. ELEVATION TOP OF HOLE: 273.53 ft (MSL)
18. TOTAL CORE RECOVERY FOR BORING: 0 %
19. SIGNATURE OF INSPECTOR: Charlie White

ELEVATION ft, MSL (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
273.53	0		garbage with 1 ft of sandy silt soil cover			An open face auger was used to open the hole to the water table (29.0 ft) then 6" casing was installed and a sand bailer used to open the hole to 38.0 ft (top of Yazoo clay). The casing was pulled and hollw stem auger was used to drill into the clay. The sand was allowed to collapse around the well screen.
259.03	15		sand - gray, fine to medium silty sand; grades downward into a medium sand with some fine sand and silt, changes to white color below the water table (29.0 ft); pea gravel in lower 1 ft.			
235.53	38		clay - green, fossiliferous, stiff, plastic (Yazoo clay)			
231.53	42		Bottom of hole at 42.0 ft			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: Pearl River Cut-off — HOLE NO. W-6

APPENDIX C

SAMPLE BORING LOGS DH-1 THROUGH DH-7

BORING LOG
FIELD DATA

Project Pearl River Cut-off Site Jackson, MS Date 17 Dec 81
Location 0 + 38 on ℄ Job No.
Drill Rig Failing Inspector C. Whitten Operator A. McNamara Surface El 274.48 ft (MSL) Boring No. DH-1

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	BLOWS	CLASSIFICATION AND REMARKS
		0	1.0						--	clay soil cover
		1.0	3.1						--	landfill material (garbage)
		3.1	18.0						--	clay and sand from river channelization work in early 1960's; Yazoo clay from 3.1 to 10.0 ft.
		-----	-----						--	
		-----	-----						--	
1	18 Dec	18.0	---	20.0	21.5			1-3/8" split-spoon	3-3-3	clay, gray with iron stain and vegetation matter
2		---	---	25.0	26.5				4-4-4	clay, gray soft
3		---	---	30.0	31.5				9-9-19	sand-silty, fine with silt lenses
4		---	38.0	35.0	36.5				25-43-49	sand-fine to medium, white
5		38.0	---	40.0	41.5				8-10-18	Yazoo clay - green, fossil. stiff, plastic
6		---	---	45.0	46.5				5-11-22	Yazoo clay
7		---	---	50.0	51.5				15-20-27	Yazoo clay
8		---	---	55.0	66.5				10-14-18	Yazoo clay
9	18 Dec	---	61.5	60.0	61.5			1-3/8" split-spoon	--	Yazoo clay (splitspoon broke)
										NOTE: Pea gravel in top of sample #5 (cuttings)

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BORING LOG
FIELD DATA

Project Pearl River Cut-off Site Jackson, MS Date 8 Jan 82

Location 0 + 30 ft 129 ft W of ℄ Job No.

Drill Rig Failing Inspector C. Whitten Operator C. Drake Surface El 271.90 ft (MSL) Boring No. DH-2

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	BLOWS	CLASSIFICATION AND REMARKS
	8 Jan	0	1.0						--	clay soil cover
	8 Jan	1.0	23.0						--	landfill material (garbage)
1	8 Jan	23.0	---	25.0	26.5			1-3/8" split-spoon	3-6-29	sand - fine to medium, silty, white, iron stains
2	8 Jan	----	---	30.0	31.5				15-29-29	sand-fine to medium, white, clean
3	11 Jan	----	38.0	35.0	36.5				33-50+-	sand- fine to medium, white, clean
4		38.0	---	40.0	41.5				10-14-19	Yazoo clay-green, fossil. stiff, plastic
5		----	---	45.0	46.5				11-18-28	Yazoo clay-green, fossil. stiff, plastic
6		----	---	50.0	51.5				16-21-29	Yazoo clay-green, fossil. stiff, plastic
7		----	---	55.0	56.5				15-21-37	Yazoo clay-green, fossil. stiff, plastic
8	11 Jan	----	61.5	60.0	61.5			1-3/8" split-spoon	15-20-40	Yazoo clay-green, fossil. stiff, plastic
										NOTE: Pea gravel in cuttings in
										top of sample #4

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BORING LOG
FIELD DATA

Project Pearl River Cut-off Site Jackson, MS Date 18 Jan 82
Location 4 + 24 124 ft E of ℄ Job No.
Drill Rig Failing Inspector C. Whitten Operator C. Drake Surface El 274.07 ft (MSL) Boring No. Dh-3

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	BLOWS	CLASSIFICATION AND REMARKS
	18 Jan	0	1.0							clay soil cover
		1.0	23.0							landfill material (garbage)
		23.0	---	25.0	26.5			1-3/8" split-spoon	28-18-34	no sample in spoon; small amount of fine silty sand in catcher
		---	---						---------	
		---	---	30.0	31.5			1-3/8" split-spoon	14-13-33	same as first drive
1		---	---	31.5	33.0			2" split-spoon	No Blows	sand-fine to medium, white
2		---	38.0	35.0	36.5			1-3/8" split-spoon	12-17-29	sand-fine, white
3		38.0	---	40.0	41.5				12-20-27	Yazoo clay-green, fossil. stiff, plastic
4		---	---	45.0	46.5				9-13-24	Yazoo clay-green, fossil. stiff, plastic
5		---	---	50.0	51.5				9-15-28	Yazoo clay-green, fossil. stiff, plastic
6		---	---	55.0	56.5				10-13-21	Yazoo clay-green, fossil. stiff, plastic
7	18 Jan	61.5	60.0	61.5				1-3/8" split-spoon	10-16-26	Yazoo clay-green, fossil. stiff, plastic
										NOTE: Pea gravel in cuttings in top of sample #3

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BORING LOG
FIELD DATA

Project Pearl River Cut-off Site Jackson, MS Date 19 Jan 82
Location 7 + 58 114 ft W of ℄ Job No.
Drill Rig Failing Inspector C. Whitten Operator C. Drake Surface El 276.15 ft (MSL) Boring No. DH-4

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	BLOWS	CLASSIFICATION AND REMARKS
	19 Jan	0	1.0							clay soil cover
	20 Jan	1.0	26.5							landfill material (garbage)
1		26.5	----	30.0	31.5			1-3/8" split-spoon	9-43-50	sand-fine to medium, gray
2		----	----	35.0	36.5				36-40-40	sand-fine to medium, white, pea gravel in bottom 0.5 ft
		----	----						----	
3		----	38.0	40.0	41.5				4-10-12	Yazoo clay - green, fossil, stiff, plastic
4		----	----	45.0	46.5				10-15-27	Yazoo clay - green, fossil. stiff, plastic
5		----	----	50.0	51.5				17-25-36	Yazoo clay- green, fossil. stiff, plastic
6	20 Jan	----	56.5	55.0	56.5			1-3/8" split-spoon	8-12-30	Yazoo clay - green, fossil. stiff, plastic

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BORING LOG
FIELD DATA

Project Pearl River Cut-off Site Jackson, MS Date 21 Jan 82
Location 10 + 35 12 ft E of ℄ Job No.
Drill Rig Failing Inspector C. Whitten Operator C. Drake Surface El 257.62 ft Boring No. DH-5

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	BLOWS	CLASSIFICATION AND REMARKS
	22 Jan	0	4.0						----	Material pushed in by dozer
		4.0	---	5.0	6.5			1-3/8" split-spoon	50+ --	hit root - no sample
1		---	---	7.2	8.7				No Blows	clay-gray, very soft, iron stains,
		---	---						----	vegetative material - weight of
		---	---						----	rods and hammer pushed the split-
		---	---						----	spoon 1.5 ft deep.
		---	---	10.5	11.5				3-3-4	No sample in spoon
2		---	---	15.0	16.5				4-9-8	sand - fine, silty, gray
3		---	23.0	20.0	21.5				12-15-16	sand-fine to medium, white
4		23.0	---	25.0	26.5				3-9-15	Yazoo clay-green, fossil. stiff, plastic
5		---	---	30.0	31.5				7-12-14	Yazoo clay-green, fossil. stiff, plastic
6		---	---	35.0	36.5				12-17-27	Yazoo clay-green, fossil. stiff, plastic
7	22 Jan	---	41.5	40.0	41.5			1-3/8" split-spoon	11-15-20	Yazoo clay-green, fossil, stiff, plastic
										NOTE: Pea gravel in cuttings in
										top of sample #4

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

BORING LOG
FIELD DATA

Project Pearl River Cut-off Site Jackson, MS Date 23 Jan 82
Location 15 + 46 30 ft E of ℄ Job No.
Drill Rig Failing Inspector C. Whitten Operator C. Drake Surface El 282.32 Boring No. Dii-6

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	BLOWS	CLASSIFICATION AND REMARKS
	23 Jan	0	1.0							clay soil cover
		1.0	33.4							landfill material (garbage)
1		33.4	---	32.5	34.0			1-3/8" split-spoon	4-7-10	0.2 ft garbage mixed with sand
		---	---						------	0.5 ft brown plastic clay
		---	---						------	0.1 ft fine to medium gray sand
		---	---	40.0	41.5				8-5-2	no sample in spoon-fine sand in
		---	---						------	catcher
		---	---	41.5	43.0				No Blows	same as 40.0 to 41.5
2	23 Jan	---	---	45.0	46.5				4-5-8	sand - fine, gray silty - very
		---	---						-----	little sample in spoon
3	25 Jan	---	---	50.0	51.5				6-9-4	sand - fine, gray, silty
4		---	58.0	55.0	56.5				20-20-30	sand-fine to medium, white, clean
5		58.0	---	60.0	61.5				17-20-34	Yazoo clay-green, fossil, stiff, plastic
6	25 Jan	---	66.5	65.0	66.5			1-3/8" split-spoon	18-24-50+	Yazoo clay-green, fossil. stiff, plastic
										NOTE: Pea gravel in cuttings in
										top of sample #5

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

BORING LOG
FIELD DATA

Project Pearl River Cut-off Site Jackson, MS Date 25 Jan 82
Location 14 + 18 148 ft E of ℄ Job No.
Drill Rig Failing Inspector C. Whitten Operator C. Drake Surface El 286.83 Boring No. DH-7

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	BLOWS	CLASSIFICATION AND REMARKS
	25 Jan	0	1.0							clay soil cover
	26 Jan	1.0	36.0							landfill material (garbage)
1	26 Jan	36.0	---	35.0	36.5	36.0	36.5	1-3/8" split-spoon	17-17-13	sand-fine, gray, silty
2		---	---	40.0	41.5				10-8-3	sand-fine, gray, silty - no sample
		---	---						------	in spoon; used handi-wrap on
		---	---						------	catcher to get sample on second try
3		---	---	45.0	46.5				10-11-16	sand - fine, white - no sample in
		---	---						-------	spoon; used 2" spoon to get small
		---	---						-------	sample
4		---	52.0	50.0	51.5				14-15-15	sand-fine to medium, white with
		---	---						-------	pea gravel in lower 0.3 ft
5		52.0	---	55.0	56.5				7-13-21	Yazoo clay-green, fossil. stiff, plastic
6		---	---	60.0	61.5				9-15-21	Yazoo clay-green, fossil, stiff, plastic
7		---	---	65.0	66.5				9-16-21	Yazoo clay-green, fossil. stiff, plastic
8	26 Jan	---	71.5	70.0	71.5			1-3/8" split-spoon	12-20-35	Yazoo clay-green, fossil, stiff, plastic

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

In accordance with letter from DAEN-RDC, DAEN-ASI dated 22 July 1977, Subject: Facsimile Catalog Cards for Laboratory Technical Publications, a facsimile catalog card in Library of Congress MARC format is reproduced below.

Alexander, Don R.
Preliminary investigation of a proposed Pearl River cutoff through the old Jackson Sanitary Landfill / by Don R. Alexander, Charlie Whitten (Geotechnical Laboratory, U.S. Army Engineer Waterways Experiment Station). -- Vicksburg, Miss. : The Station ; Springfield, Va. ; available from NTIS, 1982.
76 p. in various pagings : ill. ; 27 cm. -- (Miscellaneous paper ; GL-82-14)
Cover title.
"September 1982."
Final report.
"Prepared for U.S. Army Engineer District, Mobile."

1. Channels (Hydraulic engineering). 2. Floods. 3. Pearl River (Miss.) 4. River channels. I. Whitten, Charlie. II. United States. Army. Corps of Engineers. Mobile District. III. U.S. Army Engineer Waterways

Alexander, Don R.
Preliminary investigation of a proposed Pearl River : ... 1982.
(Card 2)

Experiment Station. Geotechnical Laboratory. IV. Title V. Series: Miscellaneous paper (U.S. Army Engineer Waterways Experiment Station) ; GL-82-14.
TA7.W34m no.GL-82-14